Feto-infant pathological post-mortem and placental examination

National Guidelines for Sri Lanka

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Statement of Intent

The main purpose of these guidelines is to improve the quality of pathological post-mortem procedure performed at hospital level. These parameters of practice should be considered as recommendations only. The ultimate judgment regarding a particular step of the procedure must be made by the pathologist in the light of the circumstances prevailing at the time of the procedure.

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Preface

Sri Lanka has shown impressive achievements in maternal and infant mortality. Both perinatal and neonatal mortality rates have reduced over the years.

Understanding the cause of death plays a pivotal role in interventions to prevent fetal and neonatal deaths. If performed by a pathologist with an understanding of fetal, perinatal and infant pathology, necropsy examination is a useful method to understand the cause of death. Information gained at the necropsy examination will be useful to the grieving parents and to the clinicians who looked after the mother and the baby. Most parents are concerned about the risk of recurrence and some may harbor guilt feelings regarding their loss. The obstetricians need to know if clinical estimations of gestation and prenatal investigations regarding fetal growth and presence or absence of malformations were accurate. Obstetricians will also be concerned about the uterine response to gestation and possibility of infection of the fetus and gestational sac. Neonatologist would want to know if the clinical diagnosis was correct and whether there were unrecognized treatable causes.

Perinatal death surveillance is in operation at all specialized hospitals in the country. Post-mortem will also contribute to accuracy of cause of death determination of perinatal deaths and audits conducted at hospital, regional or national levels. In the Sri Lankan setting, feto-infant post-mortems are not routinely done in many hospitals. Negative expectations regarding usefulness of feto-infant post-mortems by general pathologists involved in busy surgical pathology practices with allocation of the fetal post-mortem to junior doctors and relative inexperience of forensic pathologists in perinatal and fetal pathology may have contributed to reducing the value of feto-infant necropsy in the Sri Lankan setting.

The national guidelines to feto-infant post-mortems and placental examination provide useful information to those who intend to perform such post-mortems. The guidelines were compiled after several consensus meetings involving pathologists, obstetricians, neonatologist, community physicians, medical geneticists and forensic pathologists. They provide information on prerequisites for necropsies, instances on which feto-infant pathological post-mortems should not be done, the procedure to be done at the post-mortem and also include annexure on consent forms, post-mortem request forms, post-mortem reporting formats and safety precautions to be adopted during necropsies. Several illustrations have been included to facilitate better understanding of the post-mortem procedure.

The editors hope that the guidelines will provide useful information to clinicians and ward staff, pathologists, forensic pathologists, medical officers and postgraduate trainees in concerned specialties on procedures to be adopted before, during and after a meticulous feto-infant post-mortem.

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Contents

1
Feto-infant pathological post - mortem examination

1. Feto-infant pathological post-mortem examination

1.1. Introduction

A post-mortem examination, including examination of the placenta, by a pathologist should be performed following all fetal and neonatal deaths, excluding the deaths that would be subjected to an inquest and a judicial post-mortem. Maximum effort should be taken to obtain consent for pathological post-mortem in all cases. In case, where parent's consent for full post-mortem examination of the body has not been obtained, the placenta, membranes and the umbilical cord can be sent to the pathologist for macroscopic and microscopic examination.

The purpose of feto-infant post-mortem extends beyond the diagnosis of the exact cause of death. The other purposes are:

1. to exclude dysmorphic features and congenital malformations which will be reassuring to the parents.
2. to identify disorders with implications for counselling and monitoring of future pregnancies.
3. to inform clinical audit of deaths including deaths due to iatrogenic conditions and confirmation of antenatally diagnosed or suspected fetal pathology.
4. for surveillance of diseases.
5. for teaching purposes.
6. for research purposes e.g. recognition of new disease entities and expansion of the knowledge on known diseases.

1.2. Pre-requisites for a pathological post-mortem

1. The specialist or the medical officer-in-charge attending the mother/baby should request the post-mortem.
2. A probable cause of death should be given for neonatal deaths.
3. The Head of the Institution should authorize performance of the pathological post-mortem.
4. Informed written consent from one or both parents should be obtained (Annexure 1- consent form).
5. The request form should include relevant features in antenatal, intrapartum and postnatal history and the purpose for requesting the post-mortem (Annexure 2). Bed head tickets (BHTs) of both the mother and the baby should be made available.
6. The hospital should have a mechanism for respectful disposal of unclaimed bodies.
7. Mortuary facilities with requirements to follow universal precautions should be made available (Annexure 3).

1.3. Circumstances under which pathological post-mortems should not be carried out

A. Stillbirths: Stillbirths are not medico-legal cases. However following cases should be referred for an inquest and a judicial post-mortem hence, a pathological post-mortem should be avoided.

1. Stillbirths unattended by a health care worker
2. When there is a clinical disagreement or doubt whether the baby was born alive
3. Stillbirths resulting from a criminal action (such as violence to the mother)
4. Death as a result of an alleged medical negligence
5. When a parent or a care giver expresses concern about the mother's antenatal or intra-partum management

B. Neonatal deaths

1. If the clinician cannot give a cause of death
2. Death following a surgical, anesthetic or an invasive procedure of the baby where death is not a reasonably expected outcome
3. Unnatural, criminal or suspicious deaths. e.g. neglect, abuse, poisoning, smothering, suspected tampering of life support equipment or medication dosage or any similar circumstances
4. Death of a baby*
    a. due to trauma in utero to the baby
    b. due to trauma to the mother during pregnancy (e.g. assault to the mother, motor vehicle accident, fall, electrocution or any similar event)
    c. due to trauma at or after delivery
5. Death as a result of an alleged medical negligence
6. Unexpected sudden death in the ward
7. When a parent or a care giver expresses concern about the mother's antenatal management, management of the labour and delivery and or neonatal management of the baby
8. When the pregnancy is the result of an alleged rape or incest or when there is a court case regarding paternity of the baby

*If any evidence of trauma or suspicious circumstances is found during the autopsy, histopathologist should stop the procedure and inform the clinician and the hospital authority to arrange an inquest. At the request of the judicial medical officer, the histopathologist shall submit an interim report of the proceeding performed by him/her.

Note:

1. In above instances, the death should be reported to the Head of the Institution for an inquest that should be followed by a judicial post-mortem.

2. The factors to be considered in each particular case will be different and the clinicians should use their professional judgment to determine whether the death is reportable to the Inquirer into Sudden Death. When necessary, responsible consultant judicial medical officer should be consulted.

1.4. General rules in performing a post-mortem

1. Ensure that the post-mortem is conducted by a consultant histopathologist whenever possible. A medical officer can perform a feto-infant post-mortem under the direct supervision of a consultant histopathologist.
2. Perform the post-mortem at the earliest possible time. Mother can be discharged from the ward if there is an unavoidable delay. Feasible time should be informed for clinicians and parents to be present at the time of the post-mortem.
3. Ensure that the placenta is also sent for examination to the same histopathologist.
4. The clinicians, who attended the mother or baby should preferably be present while the post-mortem examination is being done.
5. Ensure correct identification of the body by cross checking the details of the BHT with those in the label attached to the dead body. The following details should be checked.
    a. Name of the mother and*baby (*if available)
    b. BHT number of the mother and *baby (*if available)
    c. Sex of the baby
    d. Date and time of birth

    If there is any discrepancy, clarification with clinical staff is required before proceeding with the post-mortem.
6. Follow universal safety precautions (Annexure 3).
7. Perform external examination and examination of internal organs in-situ before evisceration.
8. Ensure that the external appearance is not disfigured during dissection.
9. Ensure the requirements are met for collection of samples for special investigations (Section 9).
10. Ensure proper collection, labeling and transport of samples.
11. Ensure proper fixation, processing, and storage and disposal facilities for all the samples collected. Collection of tissue directly to cassettes is preferred to avoid unnecessary retaining of tissue.
12. Ensure proper reconstruction of the body.
13. Inform the hospital authority to arrange proper disposal of the body after the post-mortem, at the discretion of the parents.
14. Ensure confidentiality of all photographs taken.
15. Present the findings at monthly morbidity mortality meetings

16. Document the details and findings of the pathological post-mortem in the ***Feto-infant pathological postmortem reporting format*** (Annexure 5)
17. Complete the Cause/s of Death (V - X), Maternal conditions contributing to death (Y1 - Y2) and Post-mortem details (Z) in the ***P1 - Perinatal Death Documentation Format*** (Annexure - 6)
18. Issue completed Feto-infant pathological postmortem reporting format and P1 - Perinatal Death Documentation Format to the clinician / hospital head and keep copies of the same with the pathologist

2
Post-mortem procedure

2. Post-mortem procedure

2.1. External examination

Fetal/ neonatal weights and measurements

1. Body weight (cut umbilical cord at 1cm from the insertion and remove clothes and cannulas / catheters before weighing)
2. Occipito-frontal circumference (Fig. 1A)
3. Crown rump length (Fig. 1B)
4. Crown heal length (Fig. 2A)
5. Foot length (Fig. 2B)
6. Chest circumference (Fig. 3A)
7. Abdominal circumference (Fig. 3B)
8. Inter outer canthal distance (Fig. 4.1A), inter inner-canthal distance (Fig. 4.1B), and philtrum length (Fig. 4.1C)

Compare these values with reference charts.

References for charts

Shanmugaraja Y, Kumarasiri SG, Wahalawatte SL, Wanigasekara RV, Begam P, Jayasinghe PK, Padeniya T, Dias T. Sri Lankan fetal/ birth weight charts: validation of global reference for fetal weight and birth weight percentiles. Ceylon Med J. 2013 Jun; 58(2): 62-5.

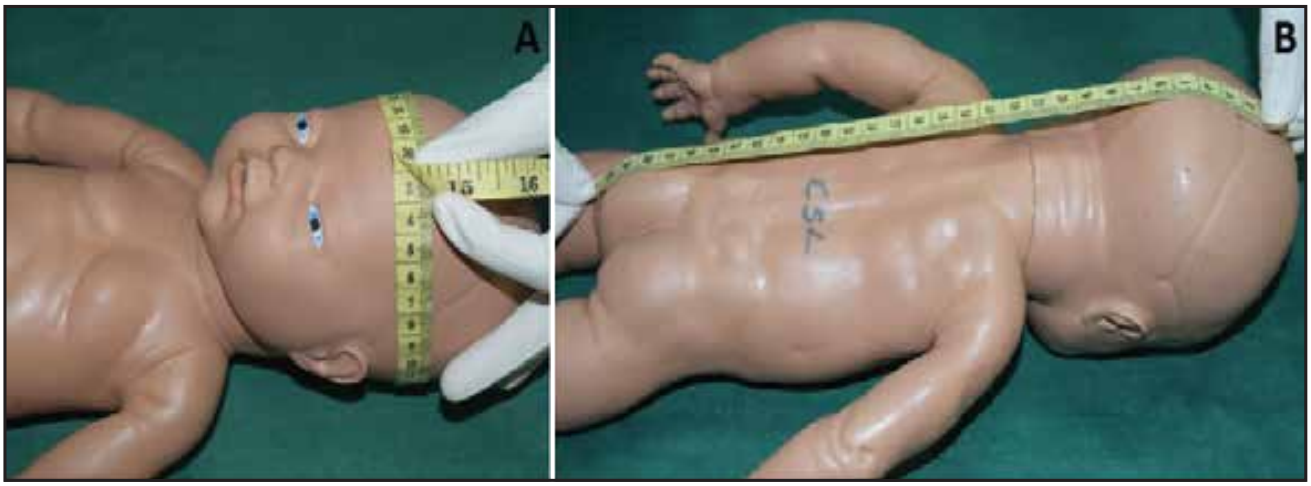

Fig. 1. Measuring occipito-frontal circumference (A) and crown rump length (B)

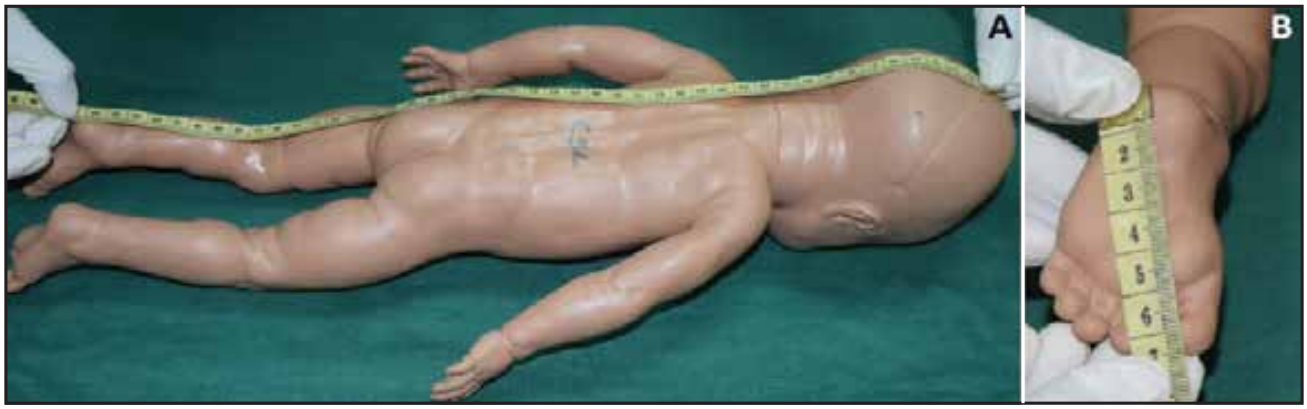

Fig. 2. Measuring crown heal length (A) and foot length (B)

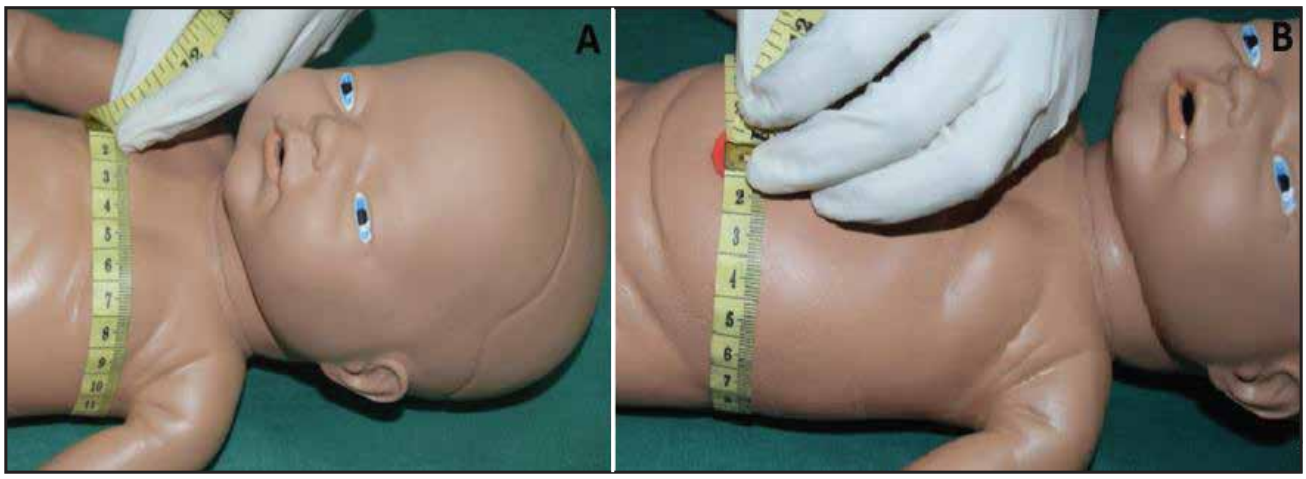

Fig. 3. Measuring chest circumference (A) and abdominal circumference (B)

General examination

Oedema, cyanosis, pallor, plethora, jaundice, meconium staining, bruising, petechial haemorrhages, evidence of trauma, evidence and the degree of maceration (Annexure 4) or any other observation

Meconium staining may not be obvious if the body has been washed prior to the post-mortem. Thus look for meconium in fingernails, behind the ear lobes and within ears.

Photographs of full body, anterior and lateral, face anterior and lateral and of all four extremities and any other abnormality should be recorded. Systematic examination from head to toe should be done using following as a checklist.

Head

Size and shape (microcephaly/ features of hydrocephalus)
Anencephaly or exencephaly, encephalocele
Other

Face

Eyes :–microphthalmia, cyclops, hypo/hypertelorism, wide epicanthal folds, upward slanting palpebral fissures
Nose :–arrhinia, proboscis, flat nasal bridge, beaked nose, choanal atresia long smooth philtrum
Cleft lip :–unilateral/ bilateral/ midline, symmetrical /asymmetrical
Palate:–clefting (anterior/ posterior, U shape/ V shape), high-arched
Mouth :–micrognathia (Fig. 5A), macro/micro glossia, meconium stain
Ears:–shape and structure, low set ears(Fig. 5A), ear tags (Fig. 5B)
Potter type face :– slanting forehead, beaked nose, micrognathia (Fig. 5A)
Other

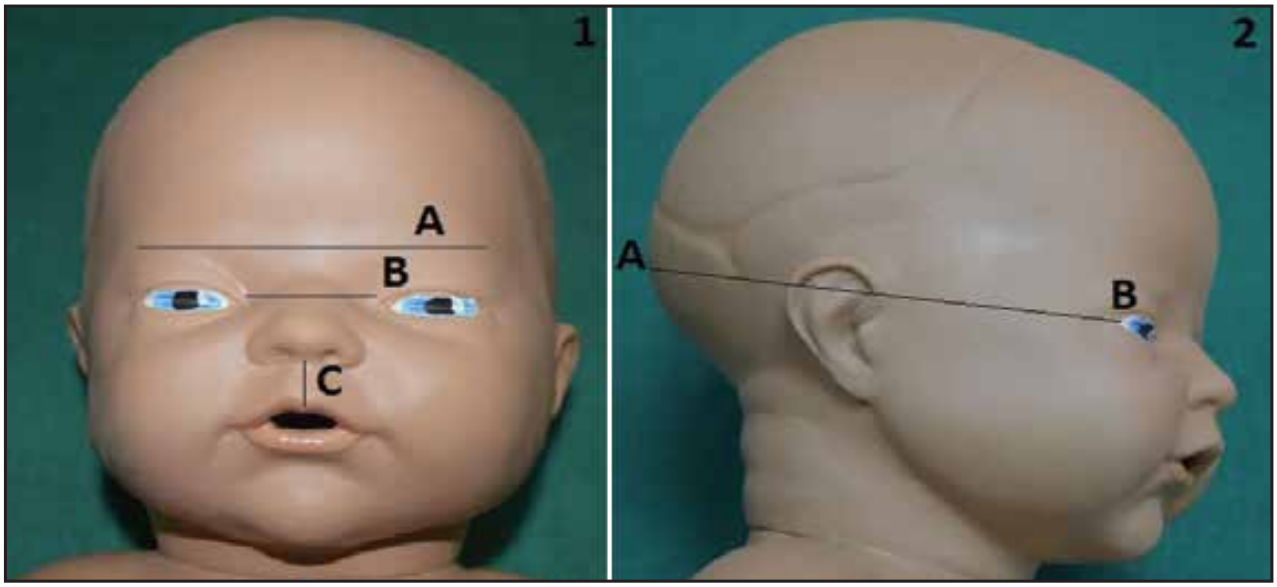

Fig. 4.1. Measuring inter outer-canthal distance (A), inter inner-canthal distance (B) and philtrum length (C) 2. Determination of the normal position of the ear: The line drawn between the occipital notch and the corner of eye should pass through the mid-upper portion of the helix.

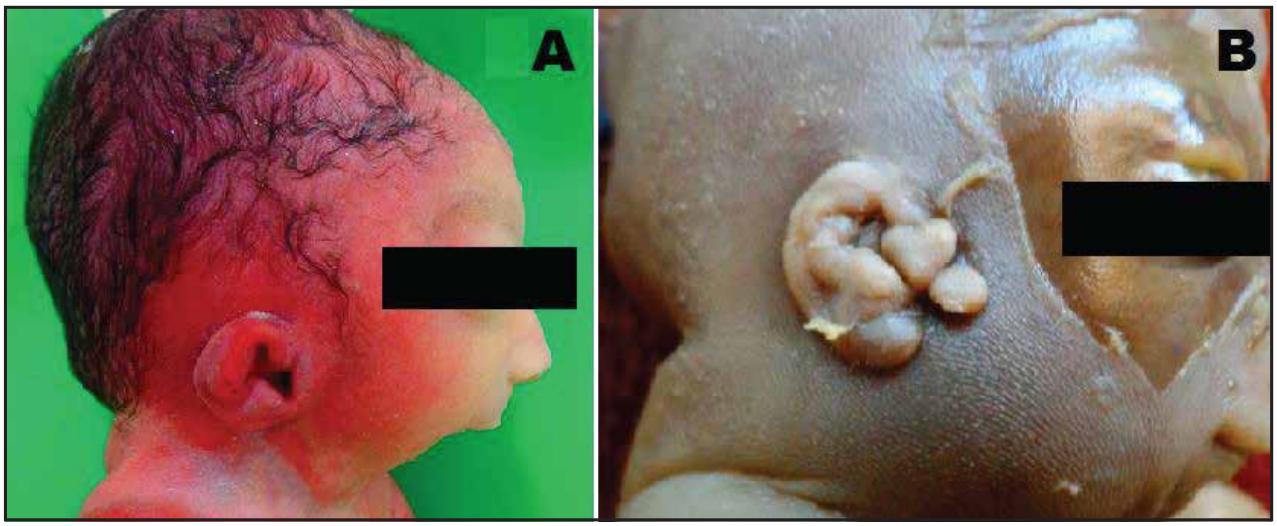

Fig. 5 A. Low set ears and micrognathia B. Pre-auricular tags

Neck

Short neck
Torticollis
Webs
Cystic hygroma (Fig. 6)

Cord round the neck: if present note whether the underlying neck shows a contusion
Other

Fig. 6. Bilateral cystic hygroma

Chest

Chest deformities – narrowing of chest wall, pectus excavatum and carinatum
Chest wall defects and herniations
Other

Abdomen

Abdominal muscle deficiency in 'Prune Belly' syndrome (Fig. 7)
Abdominal wall defects – omphaloceles, gastroschisis
Defects associated with body stalk defects (Fig. 8)
Exstrophy of the urinary bladder
Umbilicus – evidence of sepsis
Other

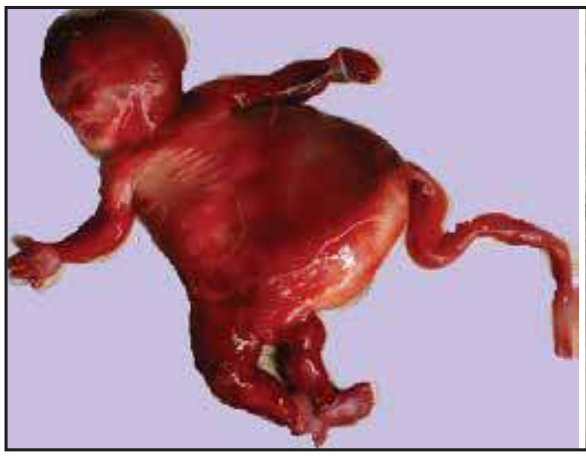

Fig. 7. Prune Belly syndrome

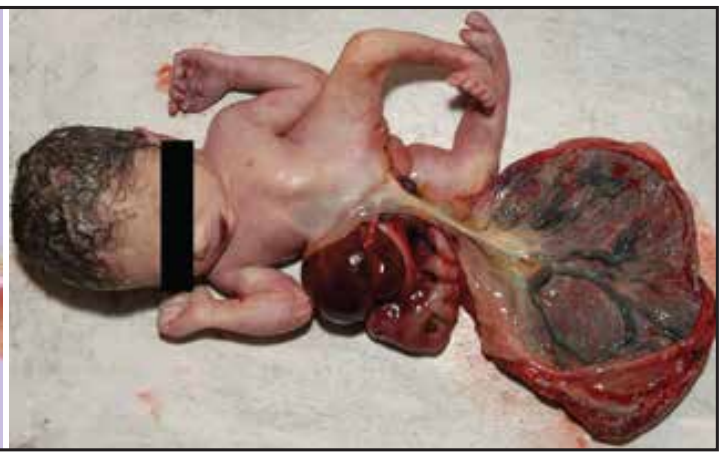

Fig. 8. Body stalk defect

Spine

Congenital scoliosis or kyphosis
Sacral agenesis
Spina bifida, meningocele and meningomyelocele
Sacral tumours

Limbs

Symmetry of all four limbs
Absence or hypoplasia of segments of limbs
Limb reduction defects
Amputations with amniotic bands
Short limbs – Achondroplasia, thanatophoric dwarfism
Sirenomelia (mermaid deformity)
Foot deformities (Fig. 9)
Syndactyly, polydactyly, clinodactyly
Split hands/ feet
Pattern of palmer creases e.g. Simian crease
Other

Fig. 9. Bilateral talepes equinovarus

Perineum

Sex (male/female)
Imperforated anus
Malformed or absent external genitalia, ambiguous genitalia
Epispadias, hypospadias
Other

** Perform a detail pelvic examination if perineal and anal anomalies are present.
** Radiological examination is useful in evaluating fetal maturity and detecting skeletal deformities (Fig. 10).
** If dysmorphic features, abnormal dermatographics or any congenital abnormality are present, consider genetic tests.
Contact a genetic laboratory before collecting samples.

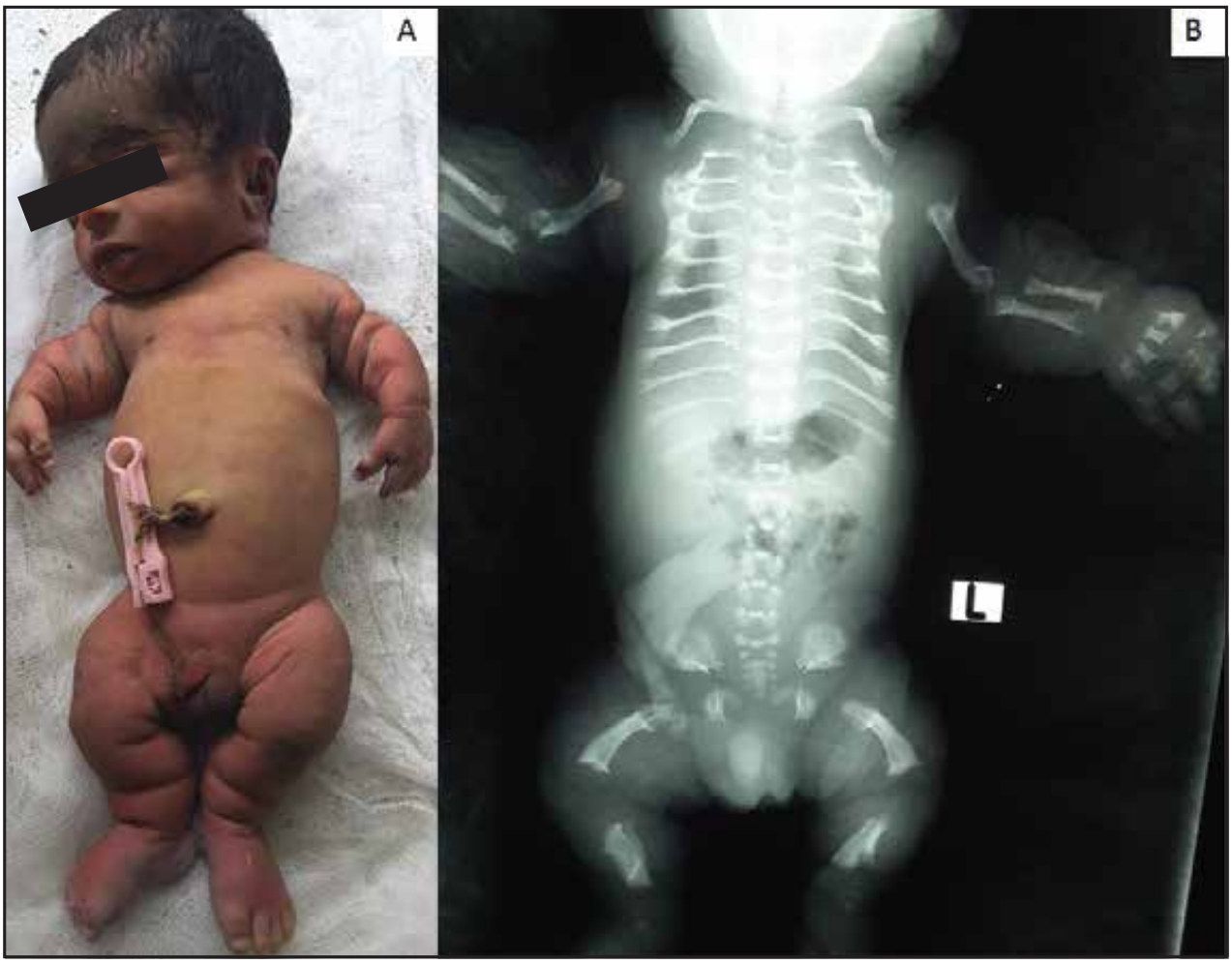

Fig. 10. A. Thanatophoric dwarfism with short limbs due to shortening of proximal segment of the limbs, narrow chest and bossy skull
B. X- ray showing transverse ribs and telephone receiver shaped proximal long bones

2.2. Internal examination

Make the skin incision according to the standard procedure for post-mortem examination. (Fig. 11. A and B)

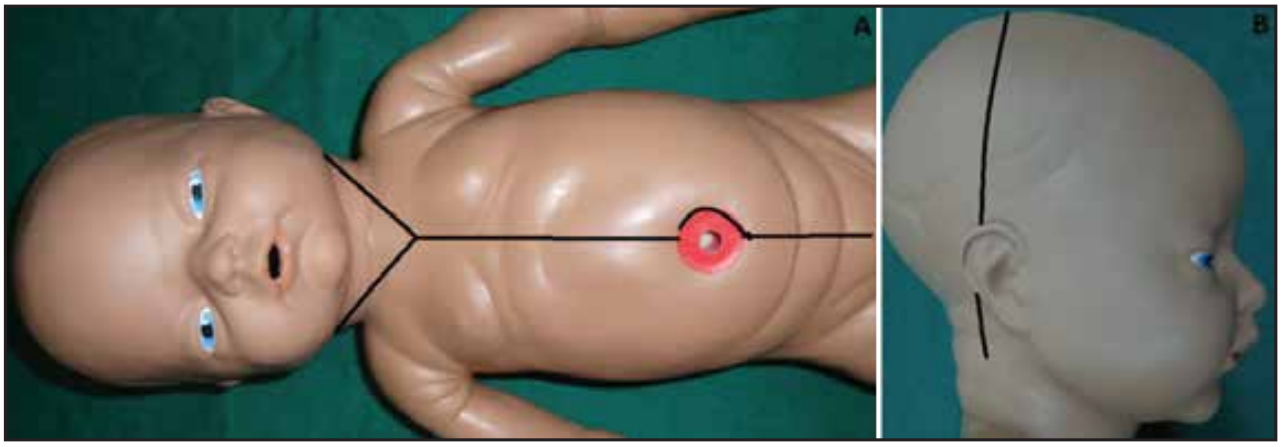

Fig. 11. A. Standard skin incision for examination of thorax and abdomen
B. Skin incision to open into cranial cavity

In-situ examination of the abdomen and pelvis

Identify umbilical vein and umbilical arteries while opening into the peritoneal cavity.
Identify the defects of the diaphragm and their location and herniation of abdominal contents into the pleural cavity, diaphragmatic eventration or accessory diaphragms. (Fig. 12 and Fig. 13)
Look for ascites, organomegaly, haemorrhages, evidence of necrotizing enterocolitis or any other pathology.
Look for mal-rotation and/mal-fixation of the bowel.
Identify features of maceration ie. Accumulation of blood stained fluids in body cavities, purplish or greenish discoloration and softening of organs.
Examine all organs including retroperitoneal organs systematically from diaphragm towards the caudal direction looking for their presence, position, size, anomalies or any pathology.

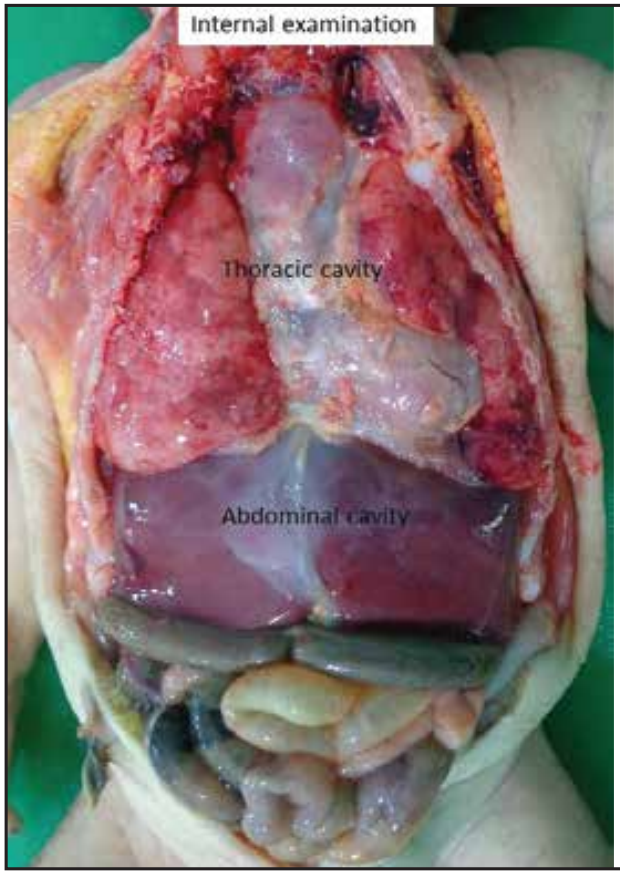

Fig. 12. Normal appearance

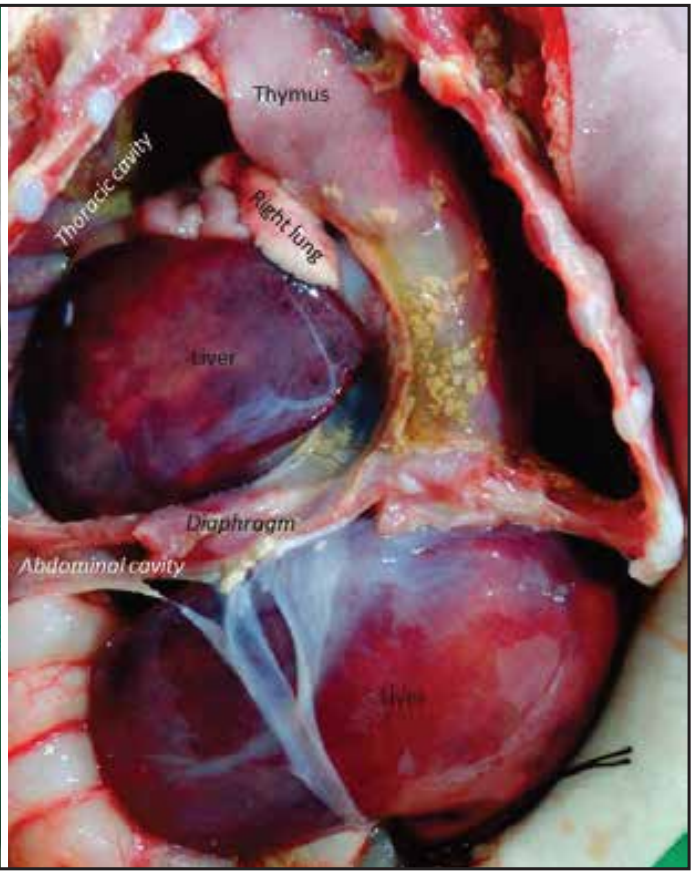

Fig. 13. Diaphragmatic hernia (right side)

In-situ examination of the thorax

Follow the steps as in Fig. 14, to demonstrate thoracic organs.

Demonstrate pneumothorax before opening into the pleural cavity.
Look for pleural and pericardial effusions and if present, measure the volume.
Look for the presence and anomalies of thyroid gland and thymus.

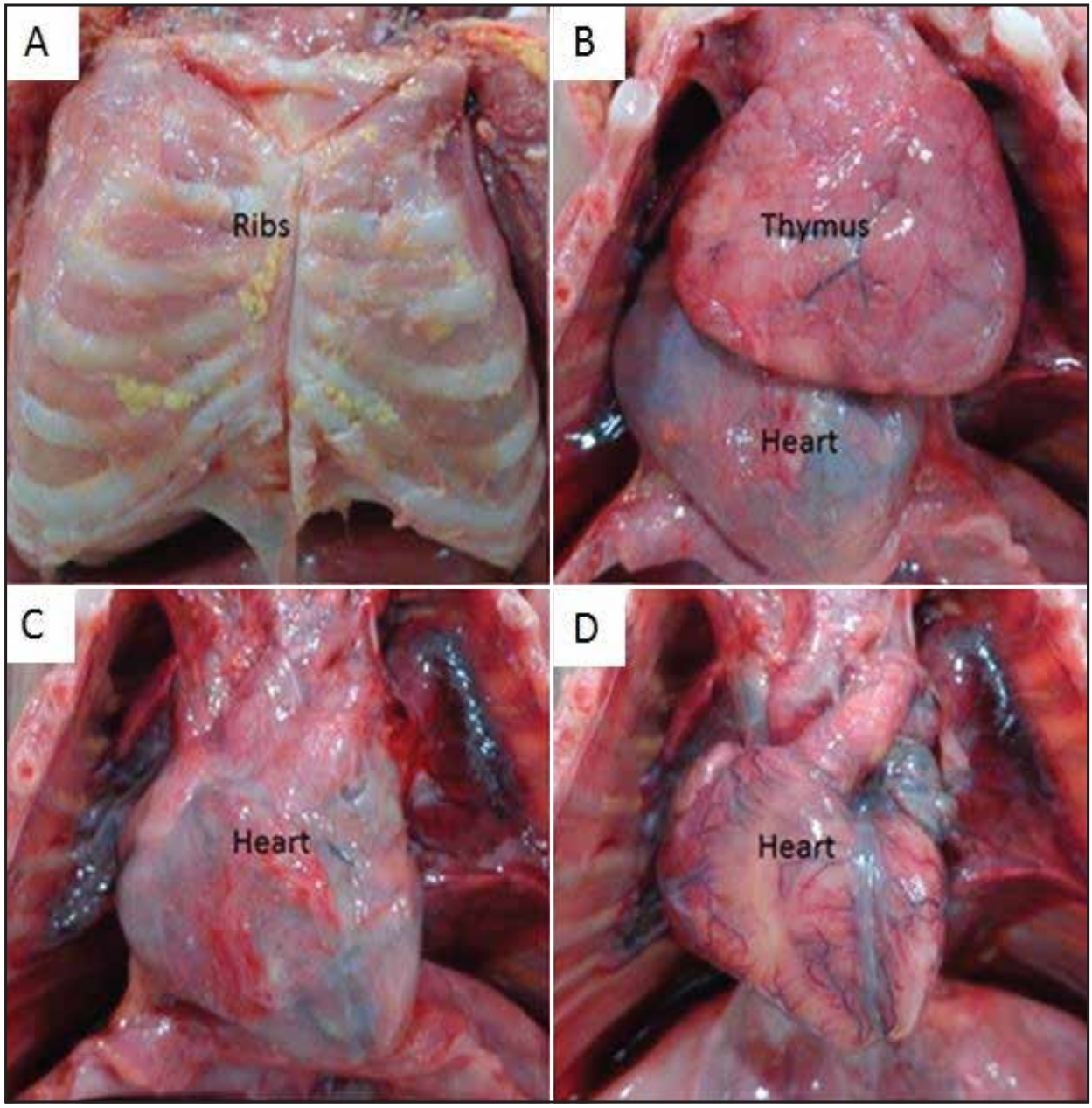

Fig. 14. Anterior view when opening into the thoracic cavity
A. After removing the skin flap
B. After removing the flap of rib cage
C. After removing the thymus
D. After cutting the pericardium

In- situ examination of heart and great vessels

Observe the following at the external examination of the heart.

The size of the heart, its location in the chest and its apical location
The atrial morphology and the situs of the atria (situs solitus / situs invertus)
Abnormalities of the pulmonary and systemic venous connections
The relationship between the aorta and pulmonary artery and the sizes of these vessels
Abnormalities of aorta and pulmonary trunk for truncus arteriosus, atresia, hypoplasia, stenosis and co-arctation of aorta
Patency of the ductus arteriosus

Internal examination of heart

Follow the direction of blood flow when opening into the chambers of the heart (Fig. 15). Use coronary arteries as a guide to the inter-ventricular septum.

The six basic steps to open into the heart are as follows:

1. Make a nick in the lateral aspect of the right atrium along the superior vena cava (SVC) inferior vena cava (IVC) line. Insert a pair of scissors and open the SVC and extend the cut into the innominate vein. Open the IVC and extend the cut inferiorly.
2. Insert a pair of scissors into the right atrium and make a cut across the tricuspid valve up to the apex of the right ventricle, parallel to the posterior descending coronary artery.
3. Extend the next cut from the apex to the pulmonary valve, parallel to the anterior descending coronary artery. Extend this cut into the left pulmonary artery, leaving the ductus arteriosus intact.
4. Make a nick at the tip of the left atrial appendage and cut through the appendage and extend the cut into each of the left pulmonary veins. Insert a probe into the right pulmonary veins and confirm whether their connections are normal or abnormal.
5. Cut along the postero-lateral wall of the left ventricle, across the mitral valve upto the apex.
6. Starting from the apex, cut along the anterior wall of the left ventricle to the aortic valve ring, parallel to the anterior descending artery. Do a blunt dissection to separate the pulmonary trunk from the aorta, to avoid cutting across the pulmonary artery. Open the aortic valve, ascending aorta and aortic arch at this continuous final cut.

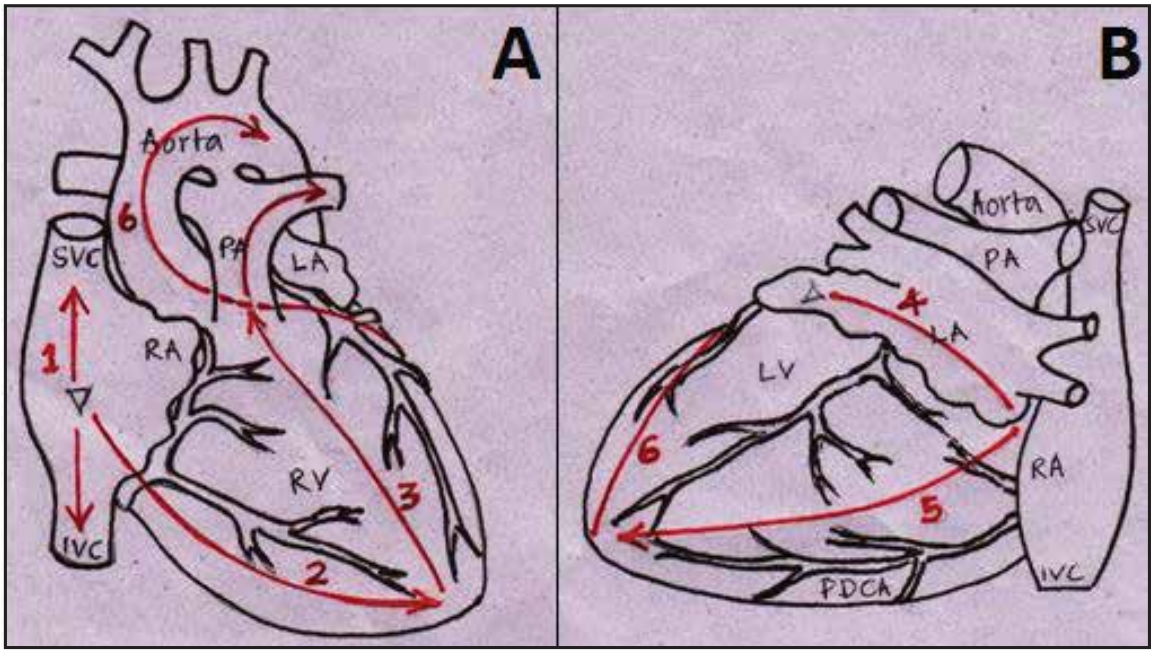

Fig. 15. Six basic steps to open into the heart. A. Anterior view B. Posterior view
RA - Right atrium, RV - Right ventricle, LA - Left atrium, LV - Left ventricle,
PA - Pulmonary artery

While opening into the heart, look for the following

- Atrio-ventricular concordance
- Ventriculo-arterial concordance
- Size and the thickness of the wall of each chamber
- Separation of chambers
- Nature of all valves (stenosis/atresia)
- Septal defects (Fig. 16. A and B)
- Nature of the endocardium e.g. subendocardial fibrosis
- Other (Fig. 17 and Fig. 18)

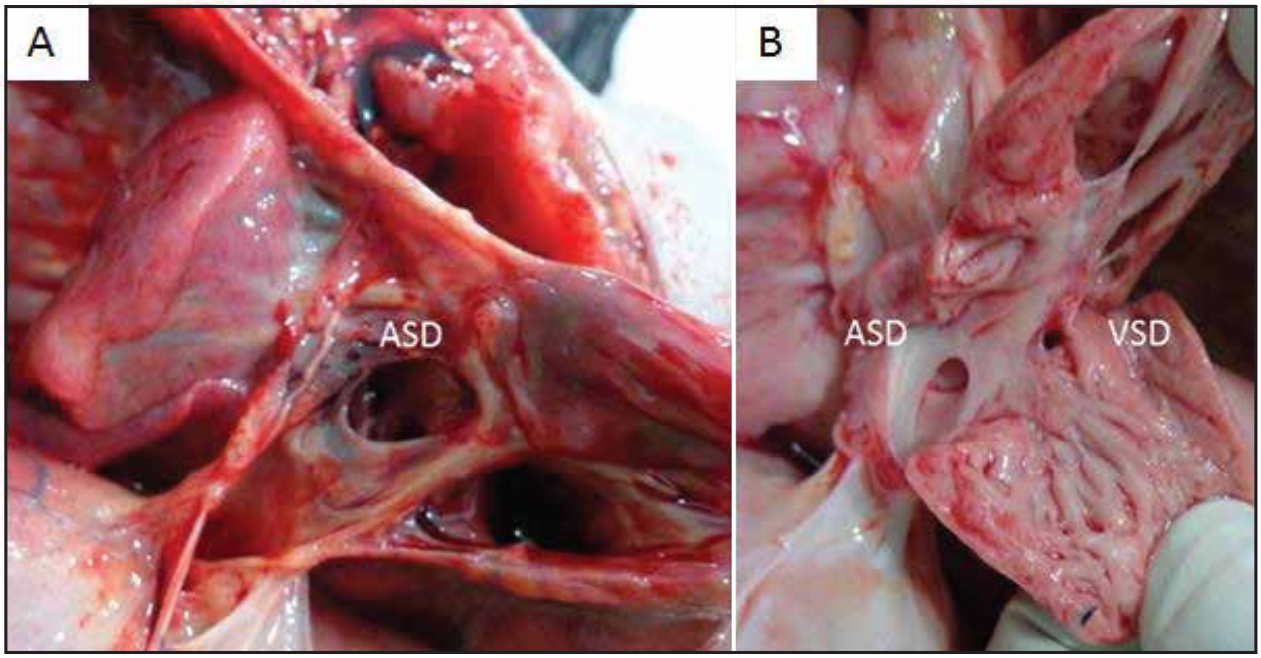

Fig. 16A. Atrial septal defect (ASD) B. ASD and Ventricular septal defect (VSD)

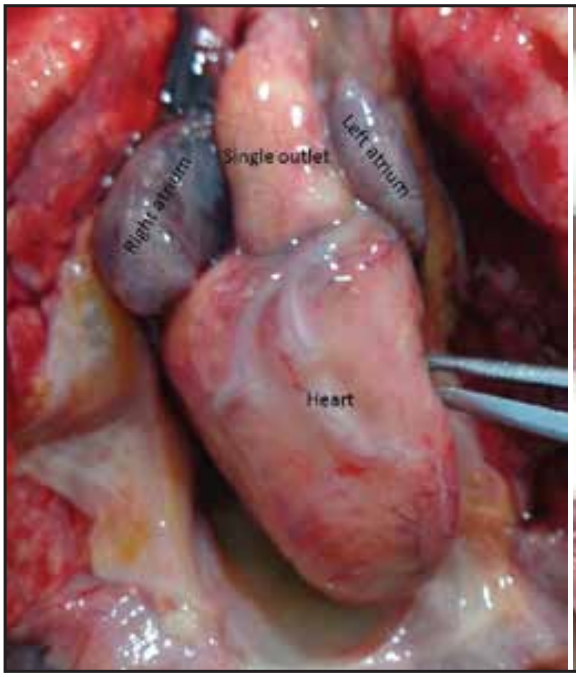

Fig. 17. Single outlet ventricle

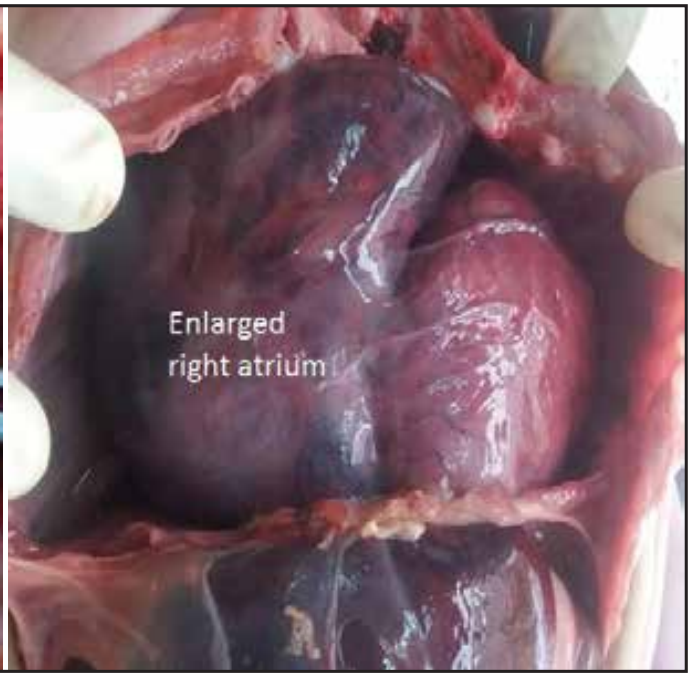

Fig. 18. Enlarged right atrium

Evisceration

Eviscerate the organs according to the standard procedure for post-mortem examination.

** Removal of thoracic and abdominal organs *en bloc* is preferred; however, alternative methods of removal of organs in several blocks may be performed.

**When congenital anomalies of the genitourinary tract and/or anorectal region are suspected, it is important to remove them *en bloc,* including the perineal and anal regions, thereby maintaining complete continuity of these organ systems to the exterior.

After the organs are removed *en bloc,* dissect further in a systematic manner, starting from the tongue and proceeding in a caudal direction.

**Weigh all major organs after examination of the organ systems.
Remove extra tissue around organs and blot organs prior to weighing.
Compare the values with the standard charts.

Examination of internal organs

Dissect each organ to identify any abnormality, using following as a checklist.

Oropharynx and oesophagus

Tracheo-oesophageal fistula
Oesophageal atresia

Larynx, trachea and lungs

Laryngeal atresia, stenosis, laryngomalacia
Tracheal atresia, stenosis, tracheoesophageal fistula
Presence of meconium
Agenesis or hypoplasia of lungs (Fig. 19)
Cystic disorders of lungs
Lungs - Petechial haemorrhages in pleura, pulmonary haemorrhages, oedema, evidence of infection and any other pathological findings (Fig. 20)

Stomach and intestines

Congenital hypertrophic pyloric stenosis
Atresia
Duplication
Omphalomesenteric (vitelline) duct remnants (e.g. Meckel diverticulum)

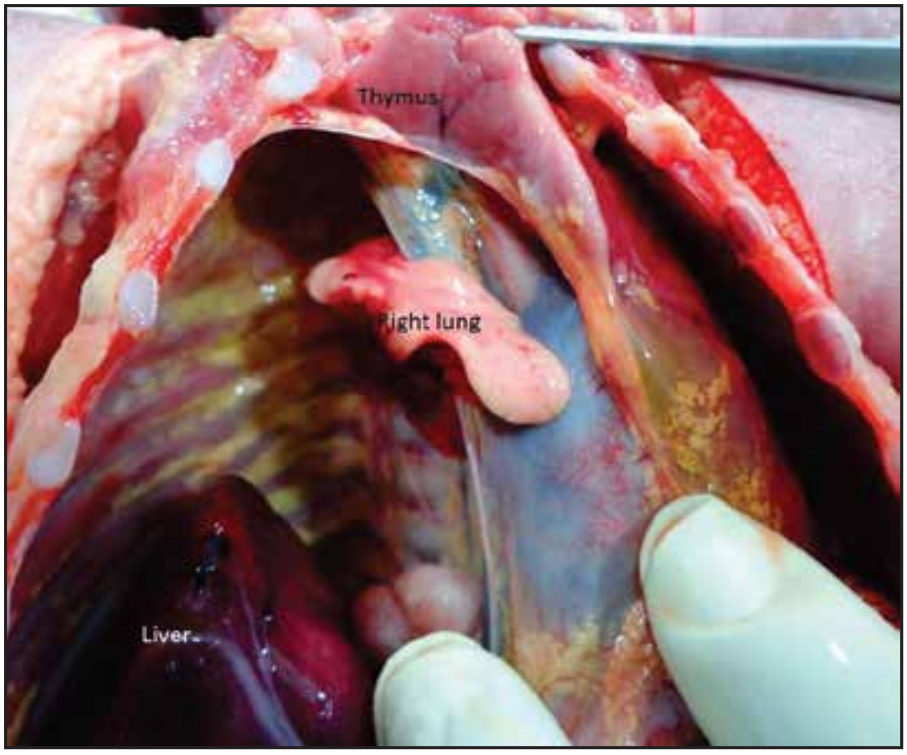

Fig. 19. Severe lung hypoplasia in a baby with right-sided diaphragmatic hernia

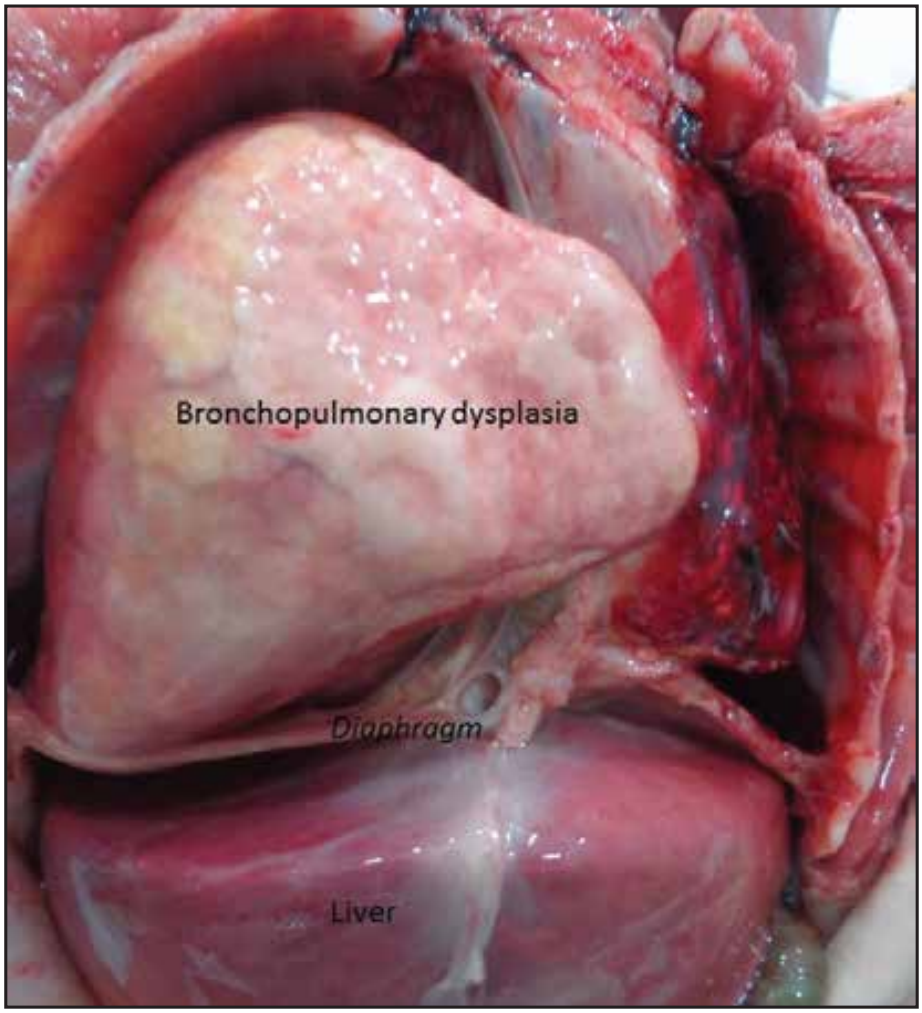

Fig. 20. Bronchopulmonary dysplasia

Anus and rectum

Anorectal atresia
Absent perineal opening
Fistulae
Persistent cloaca

Pancreas

Agenesis, hypoplasia, cysts
Heterotopic pancreas (usually in the wall of the stomach or proximal small intestine)

Liver

Patency of extra hepatic biliary tree
Cysts
Fatty change

The patency of the common bile duct is demonstrated as follows.
Release the gallbladder from its bed
Open the first part of the duodenum to display the ampulla of Vater
Press upon the gallbladder to force bile though the common bile duct

Spleen

Single / accessory spleens (Fig. 21)
Agenesis
Size and consistency

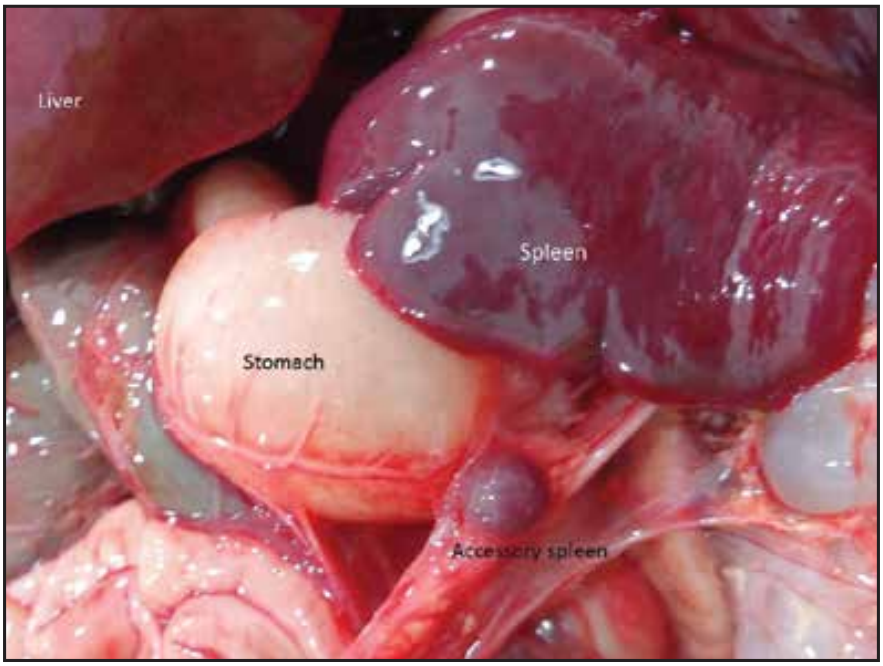

Fig. 21. Accessory spleen (splenicule)

Adrenals

Size, shape and location, haemorrhages or other

Kidneys

Normal fetal lobulation
Renal agenesis (unilateral / bilateral) (Fig. 22, 23)
Renal hypoplasia
Cystic lesions including cystic dysplasia
Ectopia, malrotation
Renal fusion – horseshoe shaped kidney (Fig. 24)
Evidence of infection

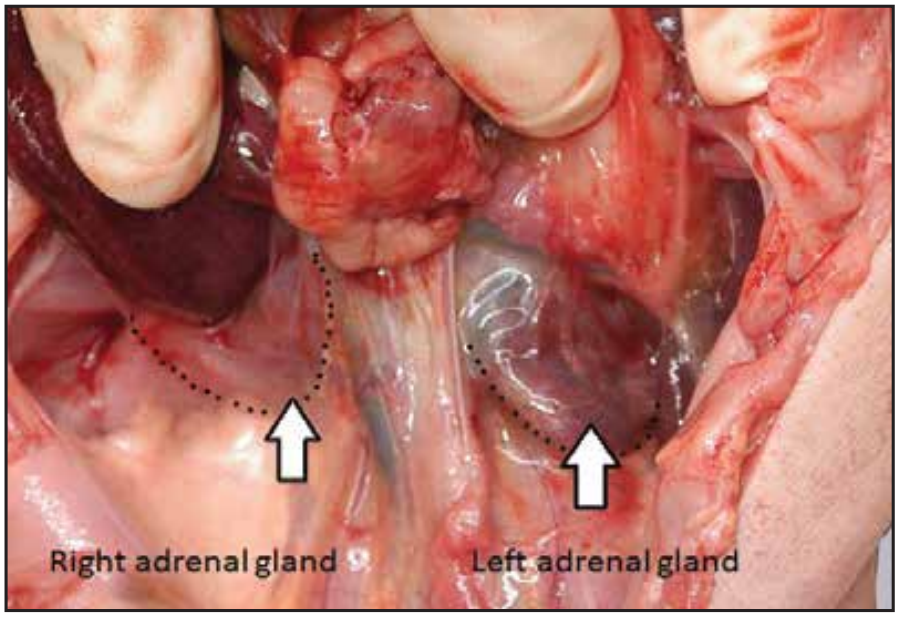

Fig. 22. Renal agenesis (anterior view: organs in-situ)

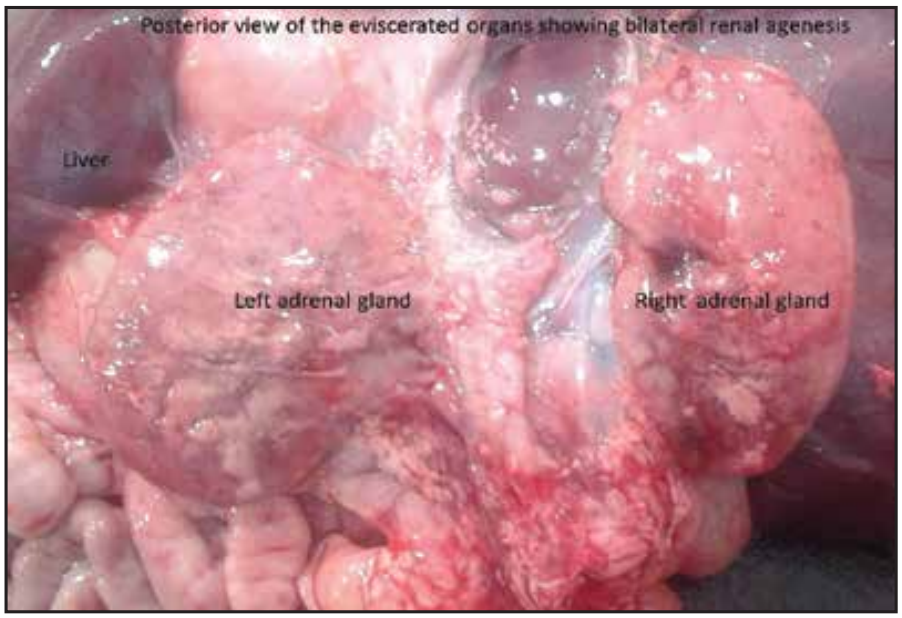

Fig. 23. Renal agenesis (posterior view: organs eviscerated)

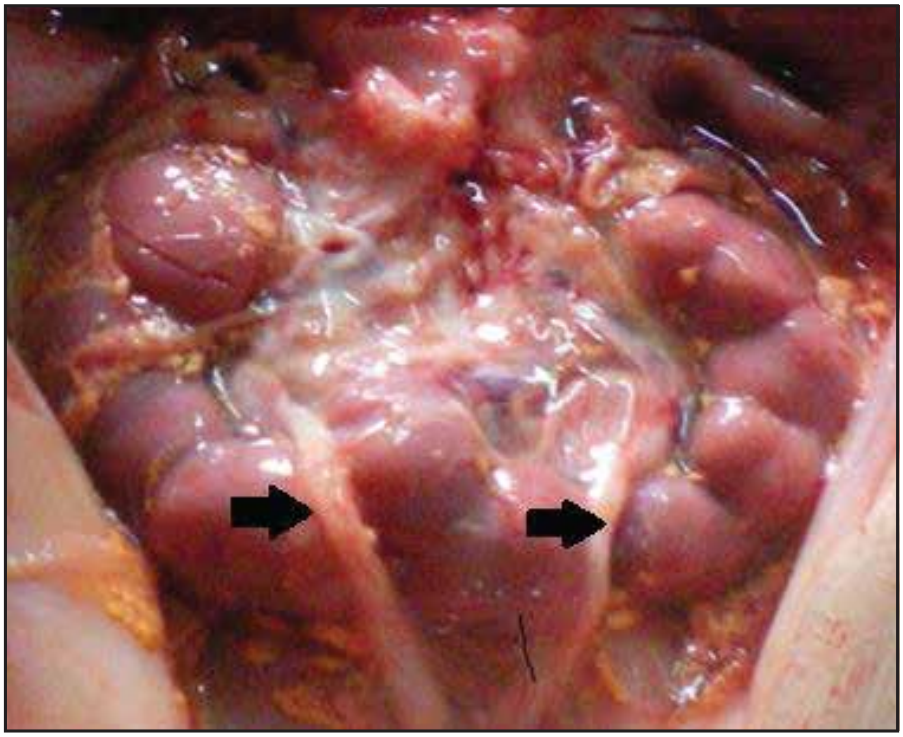

Fig. 24. Horseshoe shaped kidney with anterior ureters (arrows)

Ureters

Duplication, hydronephrosis, hydroureters (Fig. 25)

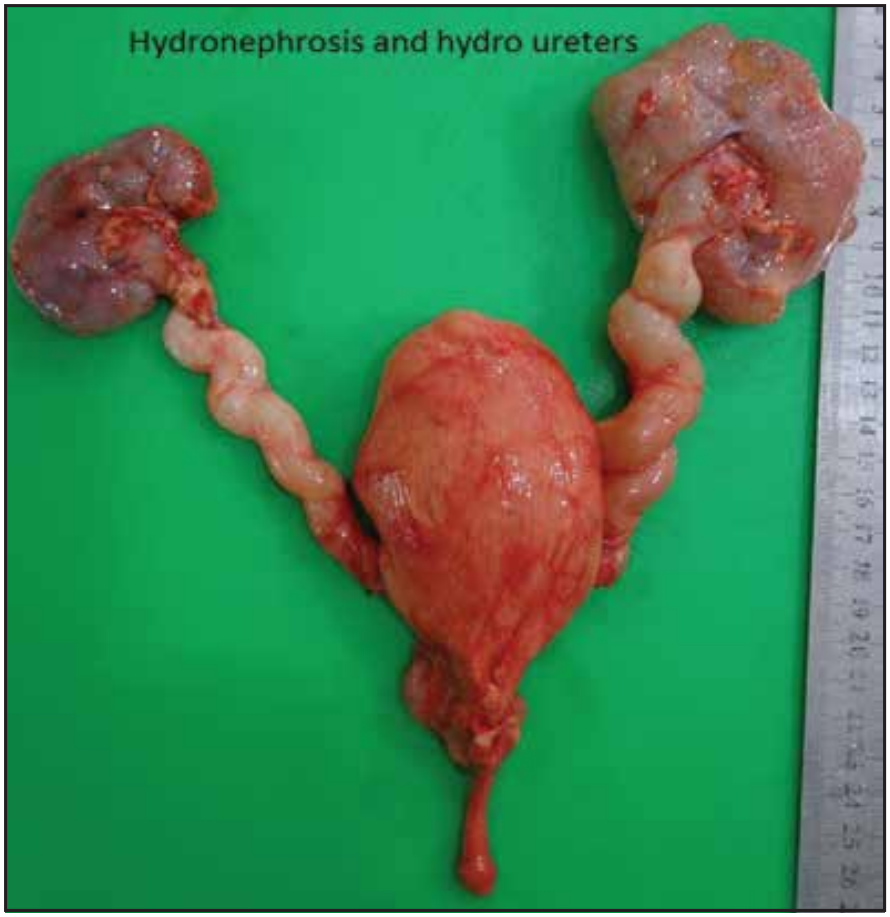

Fig. 25. Hydronephrosis and hydroureters

Bladder and urethra

Bladder anomalies
Posterior urethral valves (Fig. 26)

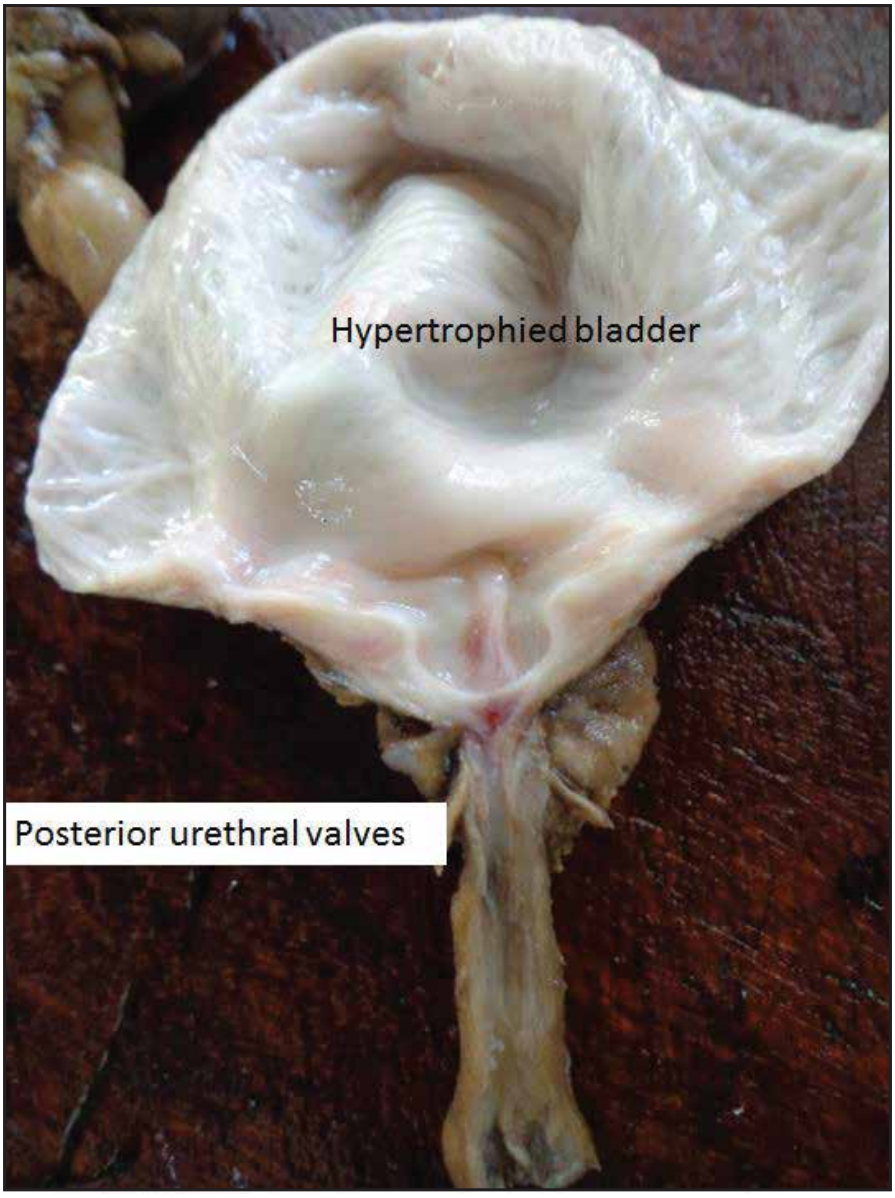

Fig. 26. Posterior urethral valves

Scalp and skull

Scalp, galeal, sub periosteal haematoma (Fig. 27), extra dural and subdural haematoma
Fontanels and suture lines (craniosynostosis/ craniostenosis)
Tentorial tears

Brain

Cerebral oedema and evidence of herniation
Abnormal gyral pattern: excessive or reduced
Haemorrhages (subarachnoid, intra cerebral and ventricular)
Thrombosis and infarctions
Periventricular calcifications
Holoprocencephaly
Agenesis of corpus callosum
Lissencephaly (agyric brain)
Vascular malformations
Congenital hydrocephalus
Malformation of the cerebellum (agenesis and hypoplasia)
Periventricular leukomalacia

Fig. 27. Subaponeurotic haematoma

2.3. Microscopic examination

Routine microscopic examination is an important part of the feto-infant post-mortem, particularly in live-born and well-preserved fetuses. Even in severely macerated fetuses, microscopic examination of tissue is helpful in estimating time since death.
(Annexure 4).

Tissue sampling for routine microscopic examination

Take sections for routine examination of internal organs as follows.
The given checklist can be used as a guide.

1. At least one section from cardiac wall including the septum and the free wall of both ventricles
   Look for myocardial and sub-endocardial fibrosis, fibre disarray, myocarditis or any other pathology.

2. At least one section from each lung and more if grossly abnormal
   Look for the stage of development, evidence of pneumonia (Fig. 28), viral inclusions, pulmonary haemorrhage, pulmonary hypertension, broncho-pulmonary dysplasia, hyaline membrane disease, meconium aspiration (Fig. 29) and aspiration of amniotic fluid (Fig. 30), cystic diseases or any other pathology.

3. At least one section from each kidney
   Look for normal glomerulogenesis and the stage of development, cyst formation, dysplasia, evidence of infection (Fig. 31A), tumours or any other pathology.

4. Sections of brain from following areas according to the suspected pathology
   Frontal cortex, internal capsule, basal ganglia, wall of lateral ventricle, hippocampus, cerebellum, pons, medulla, spinal cord, pituitary, choroid plexus and additional sections from any pathologic lesion(s) (Fig. 31B)

5. At least one section from spleen, liver, adrenals, pancreas and thymus

6. Section of a rib at the costo-chondral junction to assess the normal enchondral ossification especially in a fetus with skeletal abnormalities

7. Sections of psoas muscle if a myopathy is suspected

8. Any other organ with suspected pathology

Routine microscopic examination of all organs is recommended for the pathologist to get used to the normal histology of fetal tissue.

2.4. Other investigations

1. Samples of tissue from liver, lung, heart and spleen for microbiological studies may be obtained under sterile conditions immediately after opening into the thoracic and abdominal cavities.

2. **If a sample of blood is required for further investigations the sample can be obtained from the right atrium using an 18G needle.

3. **If samples are required for genetic studies, collect 0.5ml of fresh blood sample by intra-cardiac puncture into a heparinized tube for chromosomal studies and into an EDTA tube for molecular studies. These samples should be stored in room temperature and transported to the relevant laboratory within 24 hours. If there is a delay of 2-3 days, store the sample in the door of a fridge. Photographs of the dysmorphic features and the malformations should preferably be sent to the geneticist.

4. Skeletal survey is preferred in fetuses with skeletal deformities.

   ** It is advisable to contact the relevant laboratory before proceeding for the post-mortem to avoid sampling errors.

   ** Make sure consent of both parents are obtained if genetic tests are performed as these may disclose the biological parents.

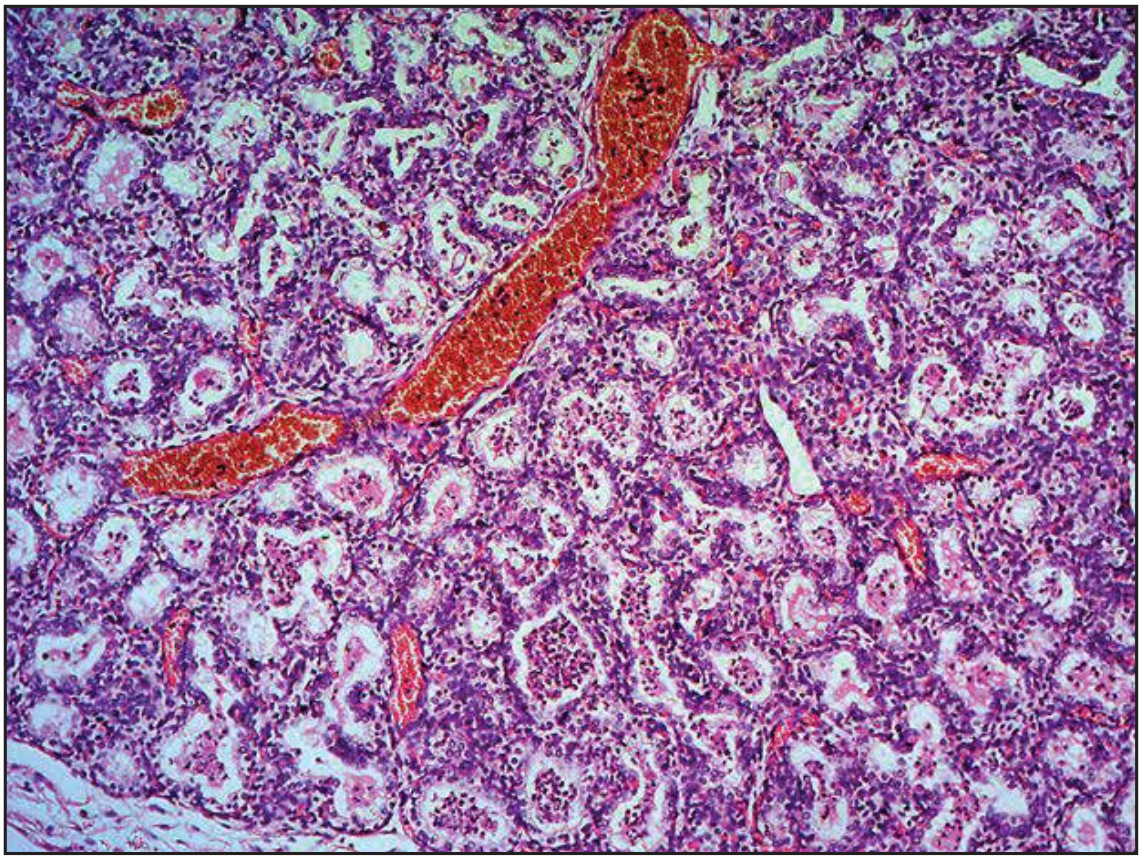

Fig. 28. Lung tissue showing fetal pneumonia (H & E x 200)

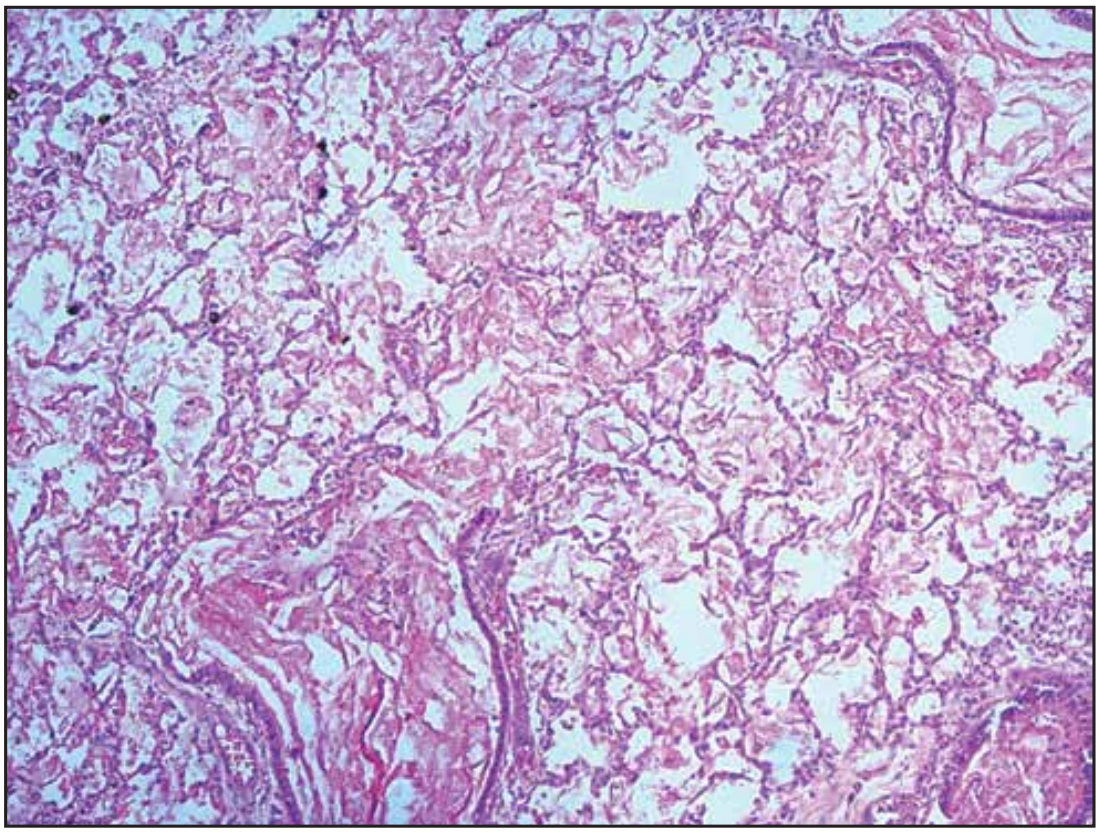

Fig. 29. Plugs of meconium in small airways of the lung in meconium aspiration (H & E x 200)

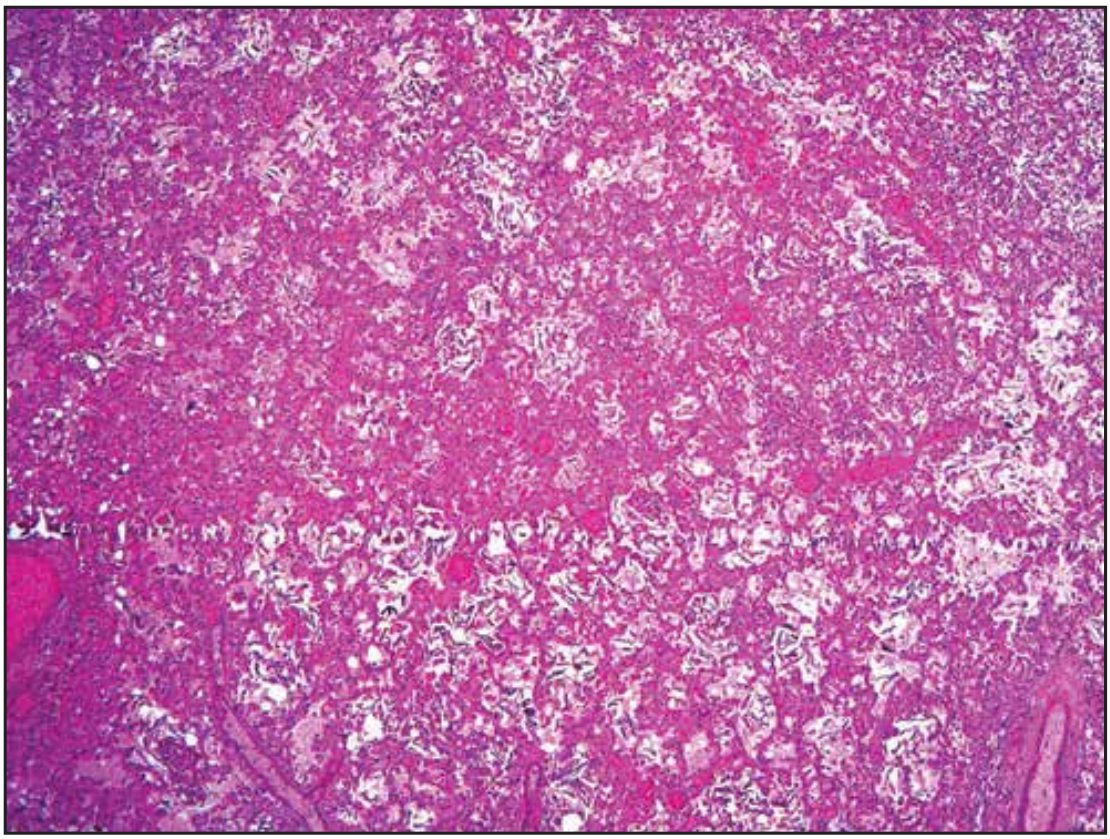

Fig. 30. Lungs showing alveoli filled with anucleate squames, suggestive of sudden intrauterine hypoxia (H & E x 100)

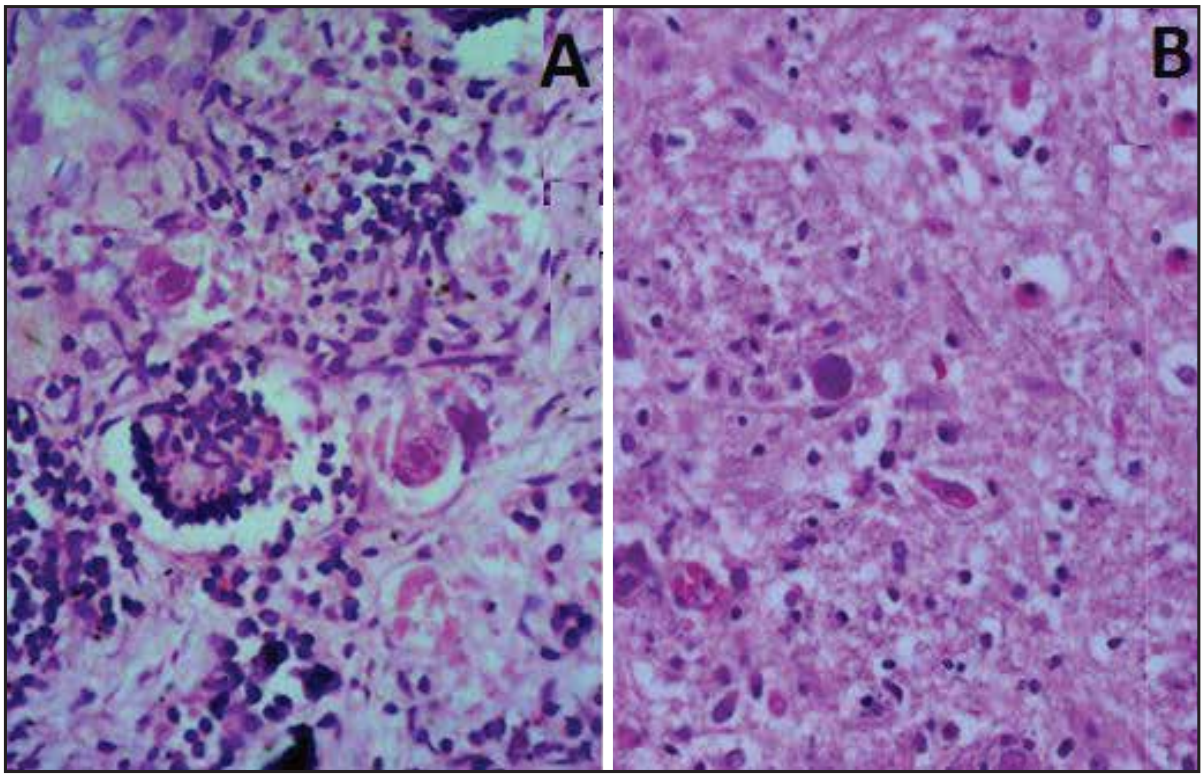

Fig. 31. Chronic infections
A. Cytomegalovirus inclusions in kidney (H & E x 400)
B. Toxoplasma pseudocyst in brain (H & E x 400)

3
Placental examination

3. Placental examination

3.1. Introduction

In 30% to 64% of cases, an indication for the cause of adverse outcome in mother/baby can be found by placental pathological examination. It is important for the management of subsequent pregnancies and for the newborn in case of live births. Parent's consent should be obtained for placental pathological examination especially if genetic testing is done. Otherwise the placenta is considered as a routine pathology specimen.

3.2. What placentae to be examined?

Pathological examination of placentae in following instances is recommended.

Perinatal death
Intrauterine growth retardation
Premature rupture of membranes
Suspected maternal/fetal infection
Renal disease
Placentae of all PBU admissions
Pre-term delivary
Twins
Pre-eclampsia
Maternal diabetes
All grossly abnormal placentae

Note:
If all above mentioned placentae were examined pathologically, there will be a substantial increase in workload to the histopathologist. Hence clinicians should use their professional judgment to prioritize the cases having prior discussion with the histopathologist.

3.3. Gross examination

1. Ideally the gross examination of the placenta should be done at fresh state before fixing in formalin. (Fig. 32A and Fig. 32B)
2. If infection is suspected obtain two swabs under sterile conditions, one from the maternal surface and the other from the sub-chorionic plate.

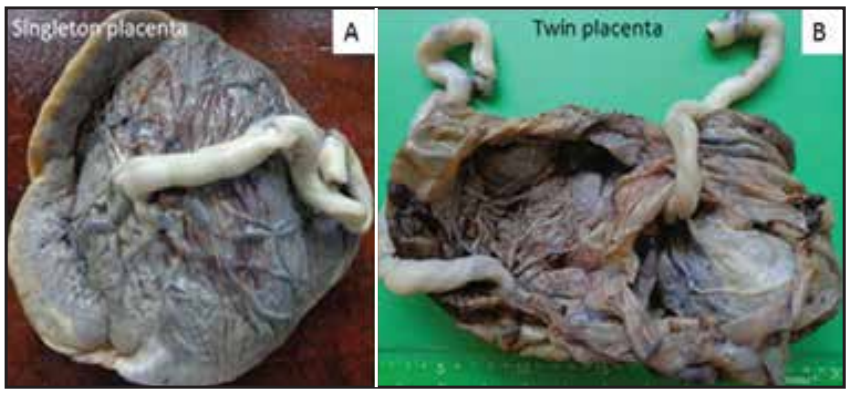

Fig. 32 A. Singleton placenta B. Diamniotic twin Placenta. (Note the dividing membrane)

3. In multiple pregnancies
    a. If the placentae are fused, carefully examine the membranes and identify the amniotic sacs and the dividing membranes. (Fig. 33 and Fig. 34)
    b. Identify the placental territory and the amniotic sac belonging to each fetus (the umbilical cords should have been labeled as to twin 1 and twin 2)

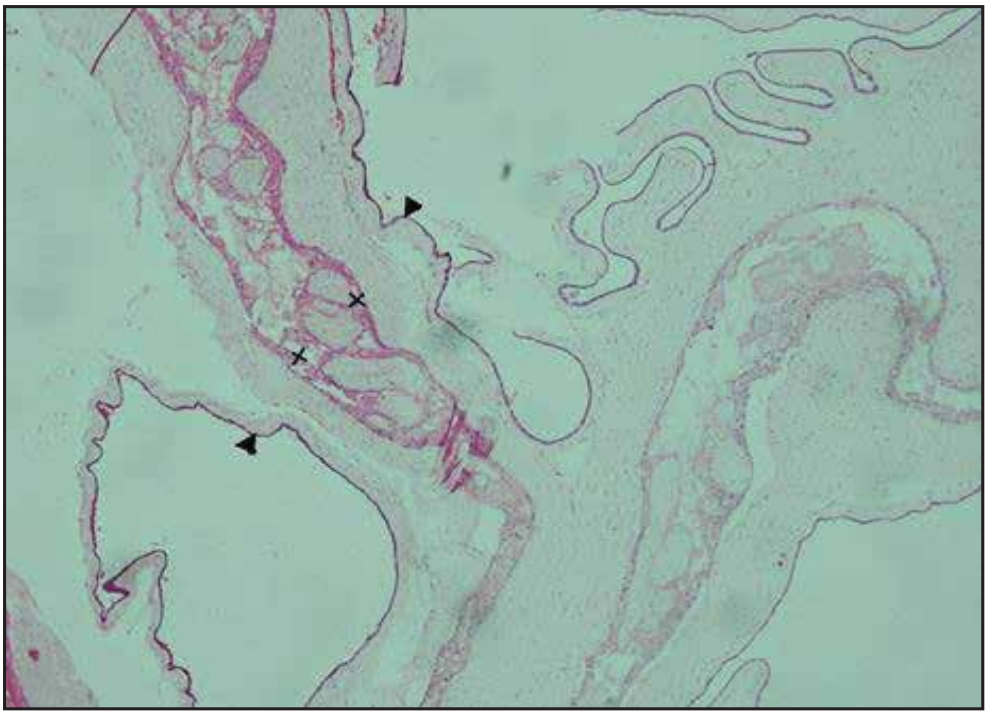

Fig. 33. Dividing membrane of dichorionic placenta (H & E x 100)

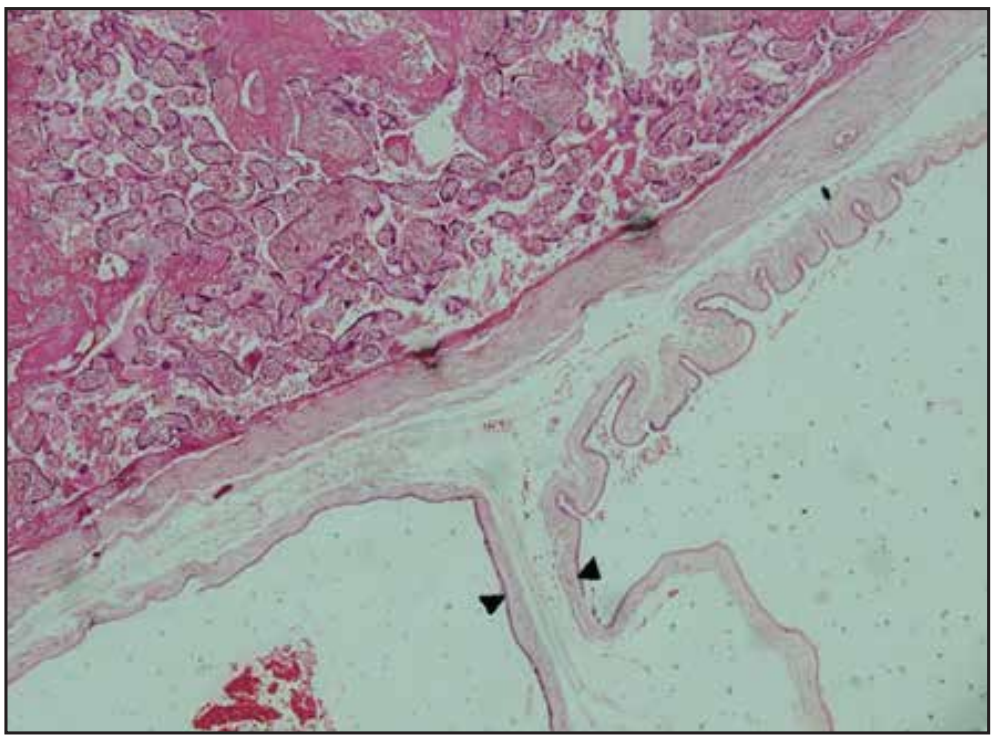

Fig. 34. Dividing membrane of monochorionic placenta (H & E x 100)

4. Systematic examination of the placenta should be done starting from the umbilical cord, membranes followed by placenta as follows.
    a. Umbilical cord (UC):
        i. Insertion – central, eccentric, marginal, velamentous
        ii. Length (mm) and diameter (mm)
        iii. Vessels (Fig. 35)
        iv. Coiling – normal, decreased or increased (Fig. 36)
        v. Focal lesions – True knots, cysts

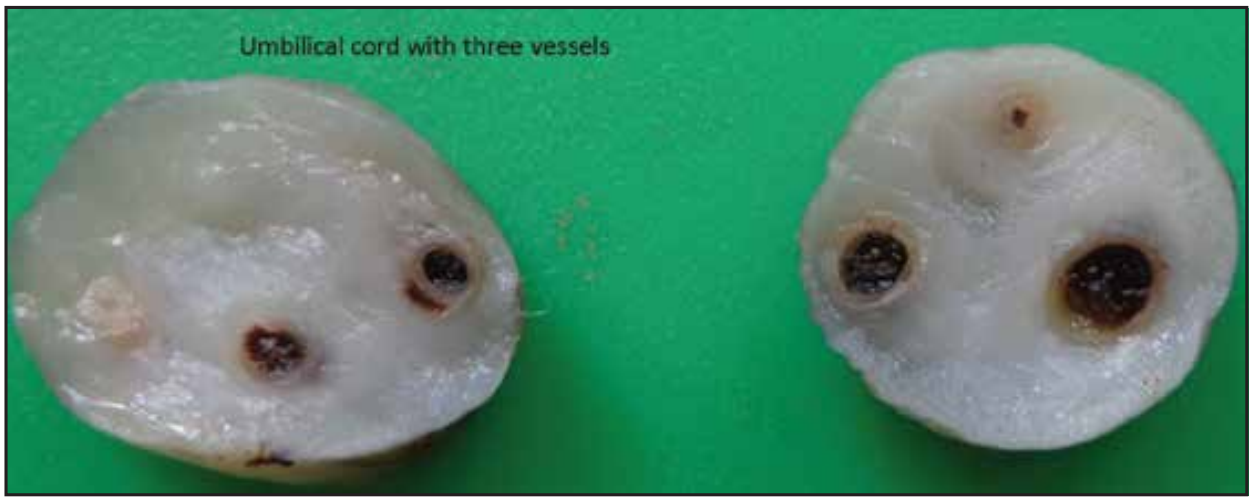

Fig. 35. Cross section of the UC showing three vessels

Fig. 36. Extensive coiling of the umbilical cord

b. Membranes:
   i. Complete, incomplete, uncertain
   ii. Colour : translucent, opaque, meconium stained (Fig. 37)
   iii. Membrane insertion: normal, circumvallate, circummarginate
   iv. Closest distance between the rupture site and placental margin (mm)

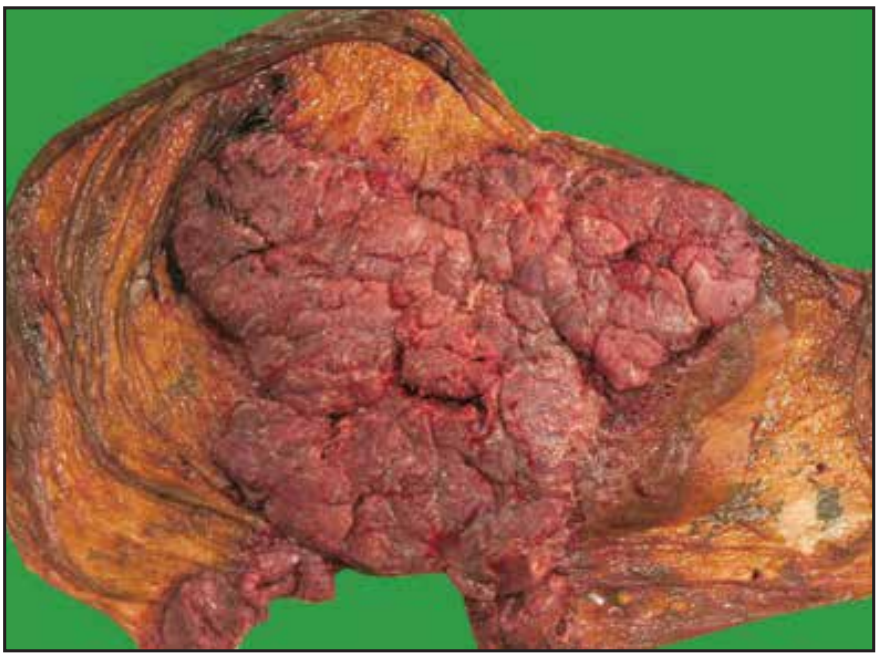

Fig. 37. Meconium stained membranes

c. Placental disc:
   i. Shape - discoid, oval, bilobed, irregular
   ii. Complete, intact
   iii. Dimensions - __x__x__cm
   iv. Trimmed placental weight - should be obtained after trimming all the membranes along their insertion and cutting the umbilical cord at 10mm distance from the insertion

d. Fetal surface:
   i. Grey/blue, green, subchorionic pale areas

e. Maternal surface:
   i. Complete, incomplete, disrupted
   ii. Indented by clots – marginal, retroperitoneal, percentage of the area covered by the clot and the weight

f. Placental parenchyma:
   i. Cut into 5-10 mm slices (Fig. 39) to look for the following

Consistency – spongy, firm, gritty
Colour – normal, pale
Focal lesions/ tumours - central, peripheral, colour, size, percentage of volume (Fig. 40 and Fig. 41)

Fig. 39. Serially sliced placenta

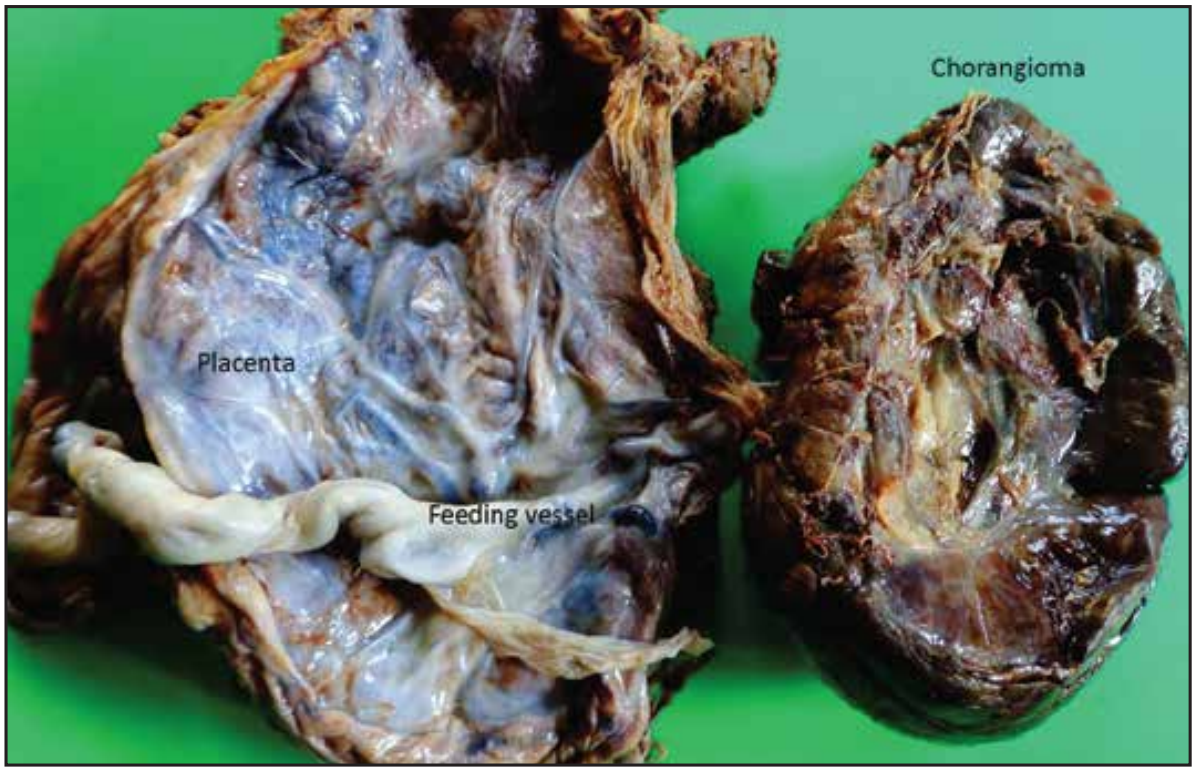

Fig. 40. Chorangioma with a large diameter feeding vessel

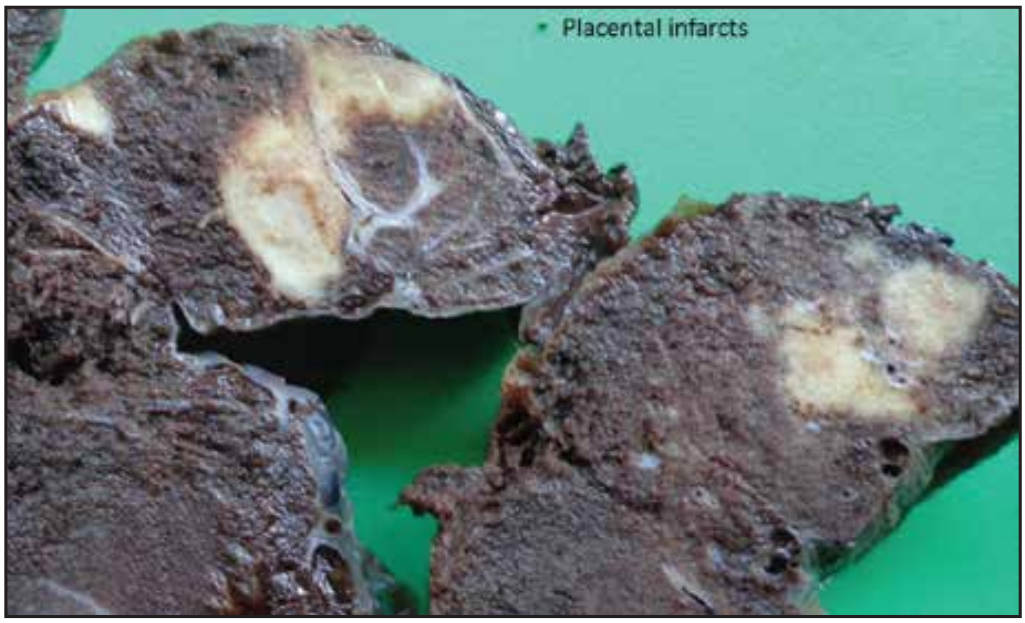

Fig. 41. Placental infarcts seen as pale firm areas

Blocks: cord (fetal and maternal ends), membrane roll, all focal lesions, grossly normal parenchyma to include amnion and decidua

3.4. Microscopic examination

Microscopic examination of placental tissue can be done using following as a checklist.

1. Umbilical cord
   Number of blood vessels, cord vasculitis or funisitis

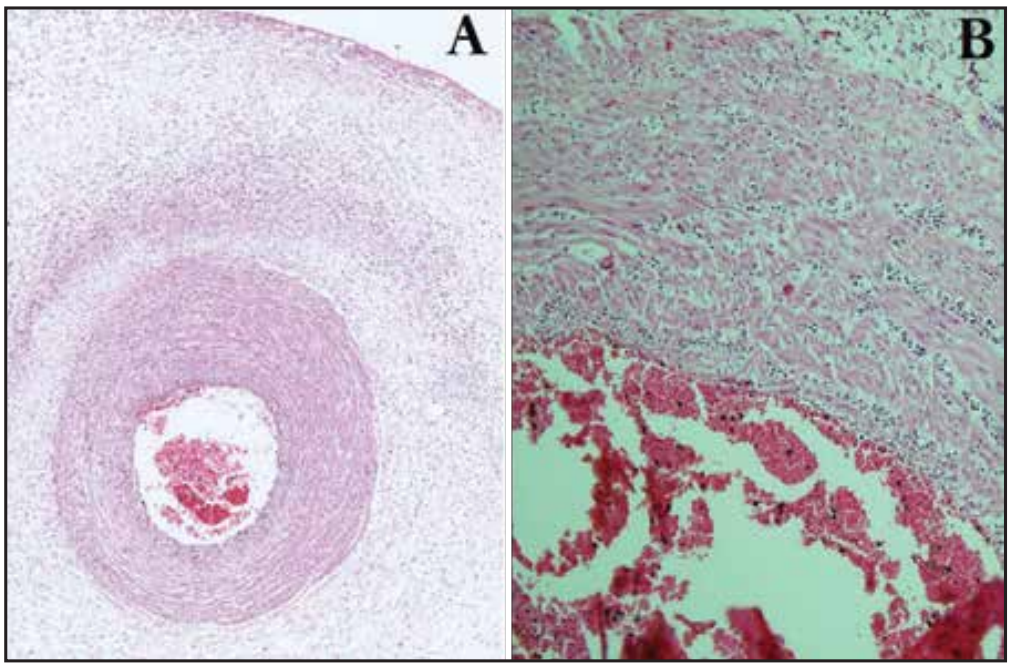

Fig. 42. Funisitis: Acute inflammatory cell infiltrate in the umbilical cord (H & E A. x 40, B. x 400)

2. Membranes
   Chorioamnionitis
   Columnar alteration of the epithelium
   Infiltration of pigmented macrophages

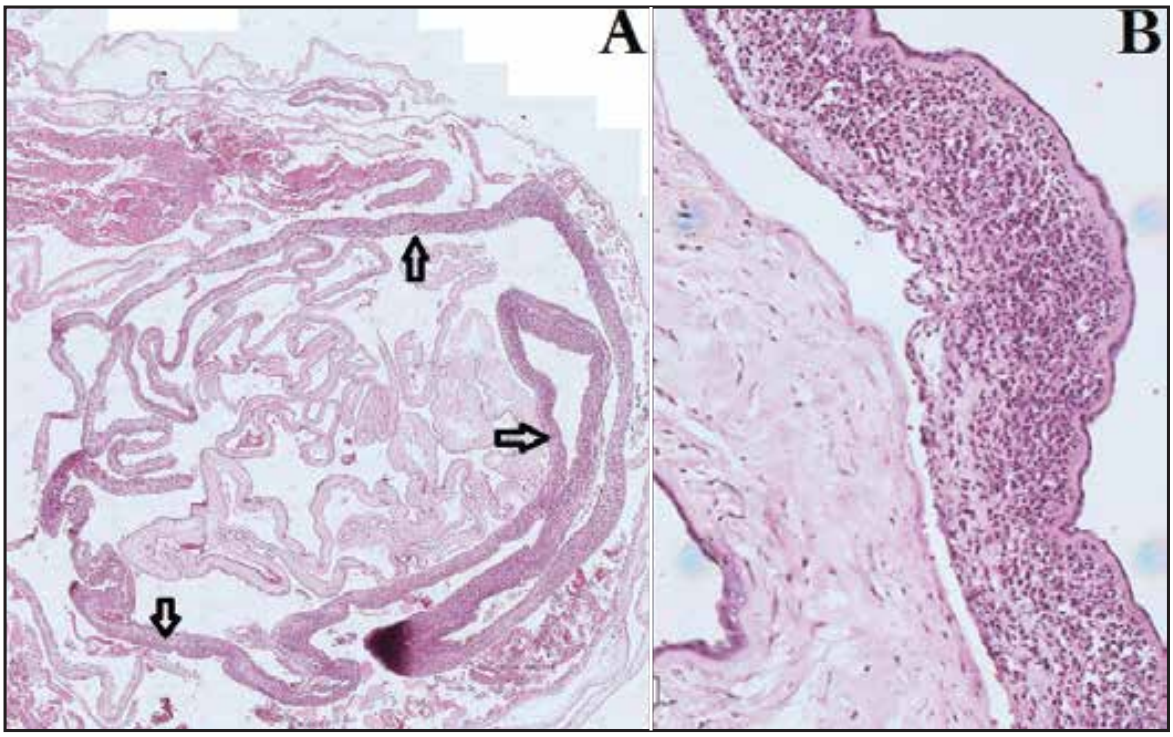

Fig. 43. Chorioamnionitis.
A. Membrane role (arrow-inflamed membranes) (H & E x 40)
B. Membranes heavily infiltrated with neutrophils (H & E x 400)

3. Villi
   Maturation: advanced / delayed/ corresponds to period of gestation in case of a stillbirth (Fig. 44)
   Changes consistent with fetal death in utero including fibromuscular sclerosis of fetal stem vessels and villous stromal fibrosis (Annexure 4)
   Nucleated fetal red cells (erythroblastosis)
   Chorangiosis
   Villitis - Acute/ chronic villitis (look for viral inclusions) (Fig. 45, Fig. 46)
   Intervillositis (histiocyte infiltration in intervillous space)
   Gestational trophoblastic disease
   Mesenchymal abnormalities

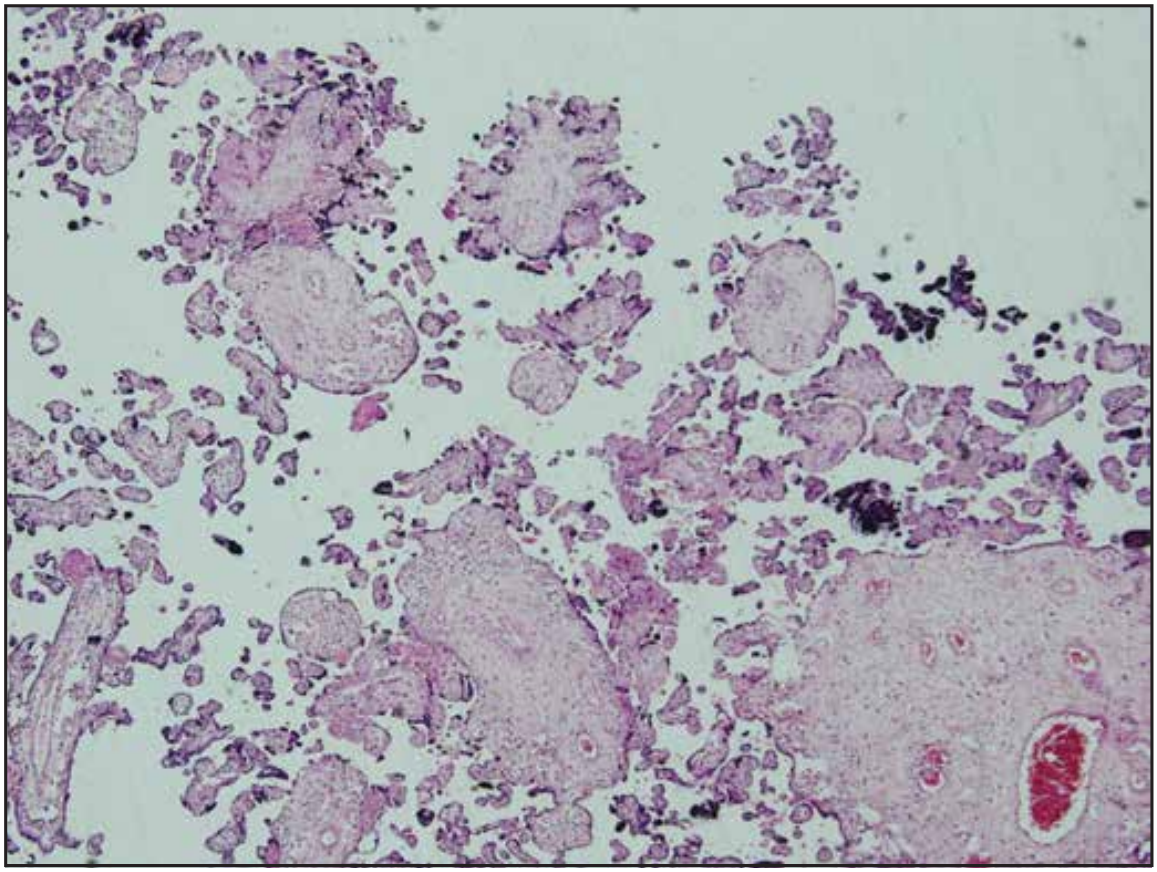

Fig. 44. Distal villous hypoplasia: Small villi with increased syncytial knots (H & E x 100)

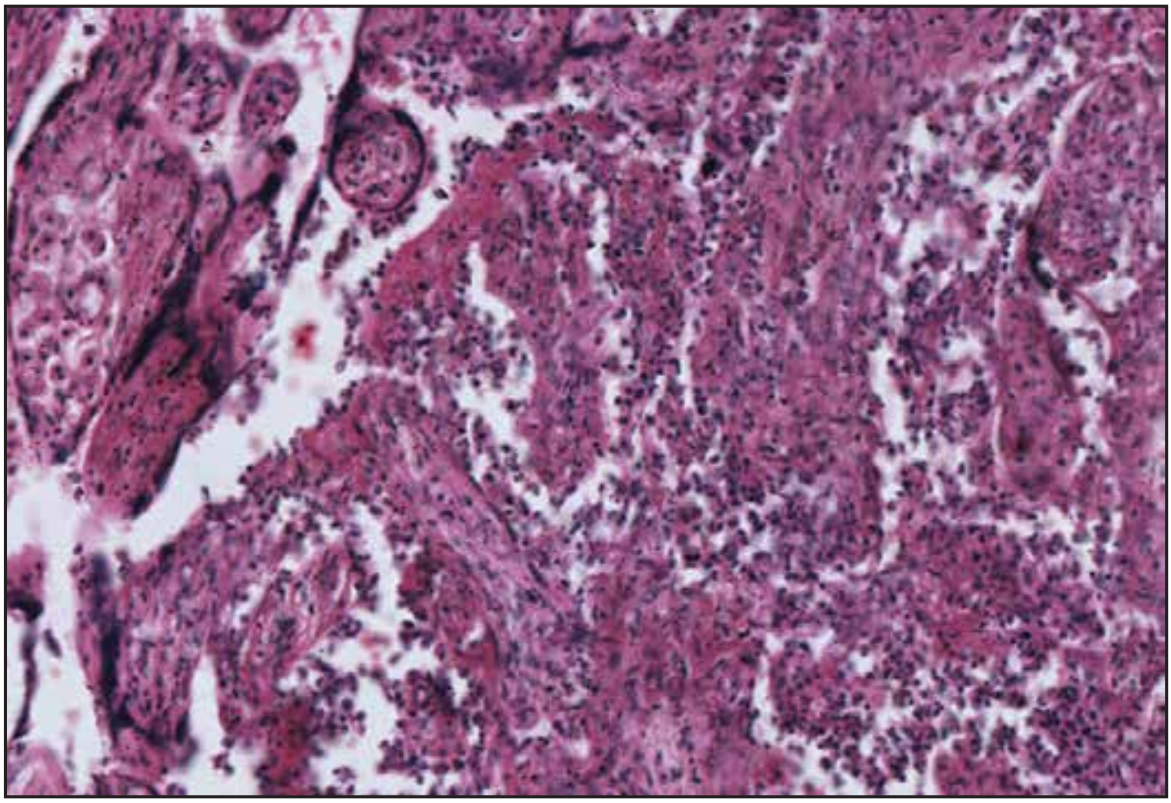

Fig. 45. Acute villtis: Mattered villi infiltrated with neutrophils (H & E x 400)

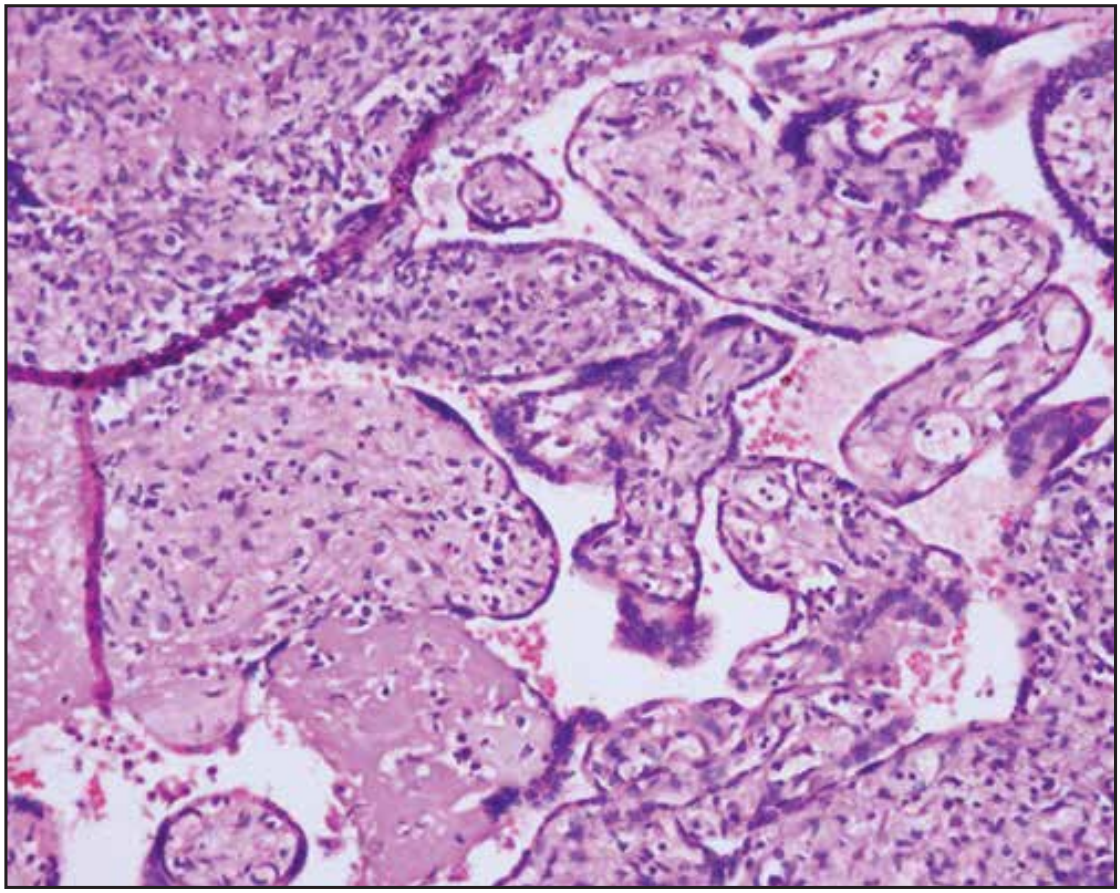

Fig. 46. Chronic villitis: Mattered villi infiltrated by lymphocytes, plasma cells and histiocytes (H & E x 400)

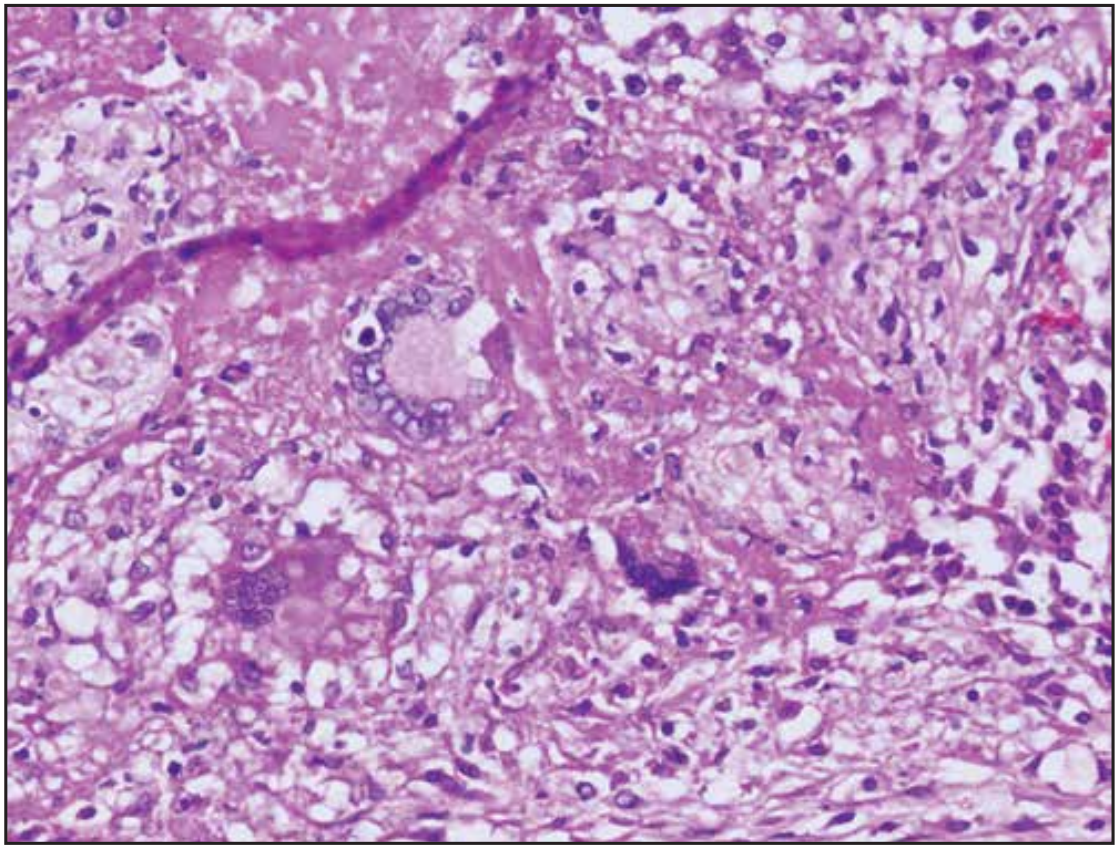

Fig. 47. Chronic villitis with granulomatous inflammation (H & E x 400)

4. Decidua
   Deciduitis (acute/ chronic)

5. Fetal blood vessels
   Vasculitis
   Fetal thrombotic vasculopathy (Fig. 48)

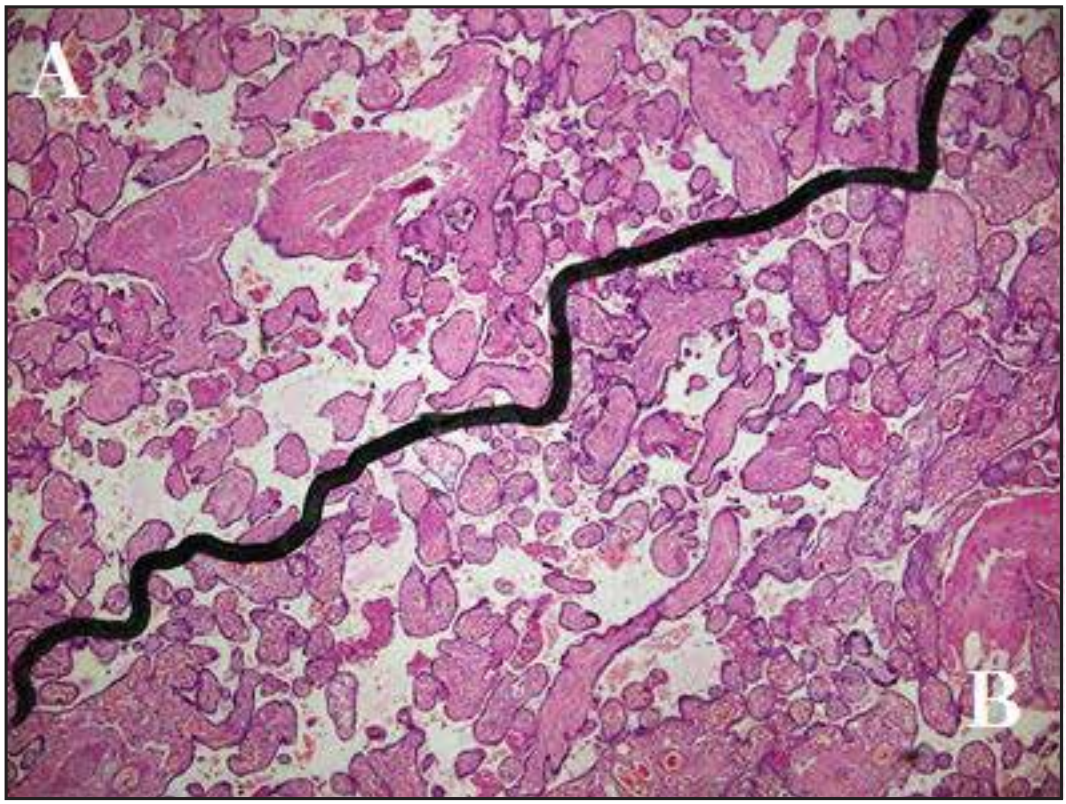

Fig. 48. Villi in fetal thrombotic vasculopathy: (H & E x 200)

A. Hyalinized avascular villi
B. Well vascularized villi

6. Maternal blood vessels
   Decidual vasculopathy - acute atherosis, thrombosis (Fig. 49)
   Persistent fibro-muscular wall

7. Focal lesions
   Infarcts (Fig. 50A)
   Intervillous thrombi (Fig. 50B)
   Marginal thrombi
   Intervillous fibrin deposition
   Retroplacental clots
   Tumours (chorangioma, other) (Fig. 51)

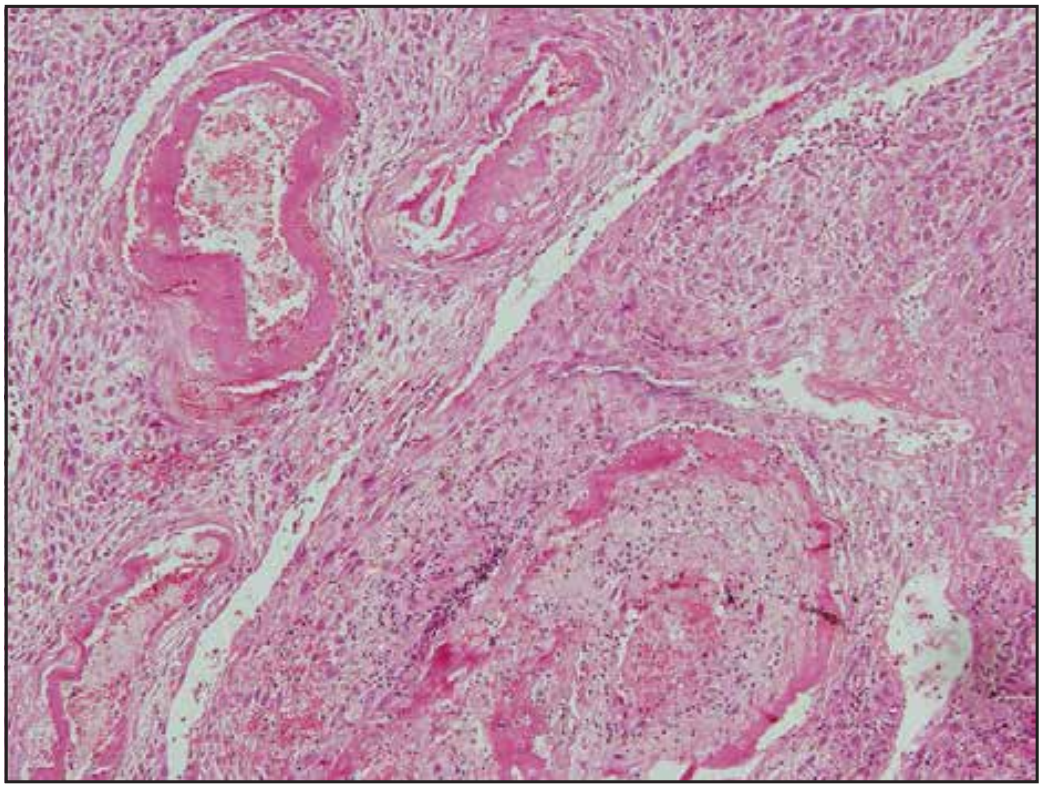

Fig. 49. Fibrinoid necrosis and thrombosis of arterioles in decidual arteriopathy (H & E x 200)

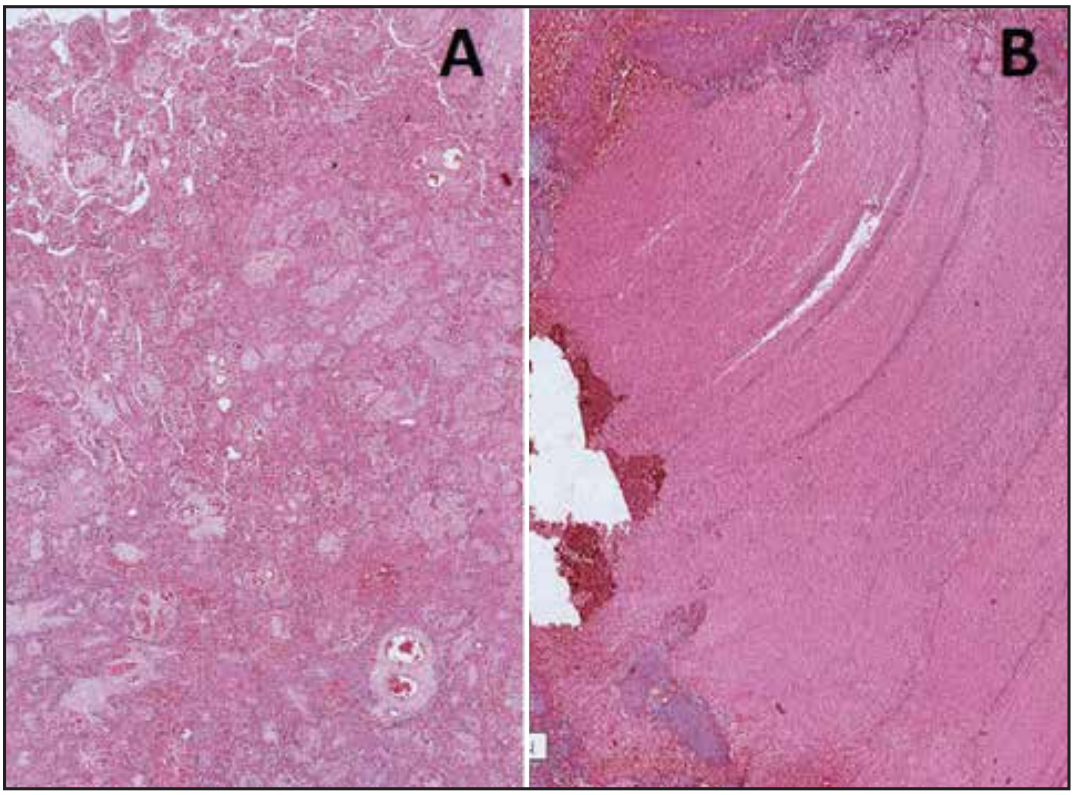

Fig. 50. Placental infarct (A) and intervillous thrombus (B) (H & E x 40)

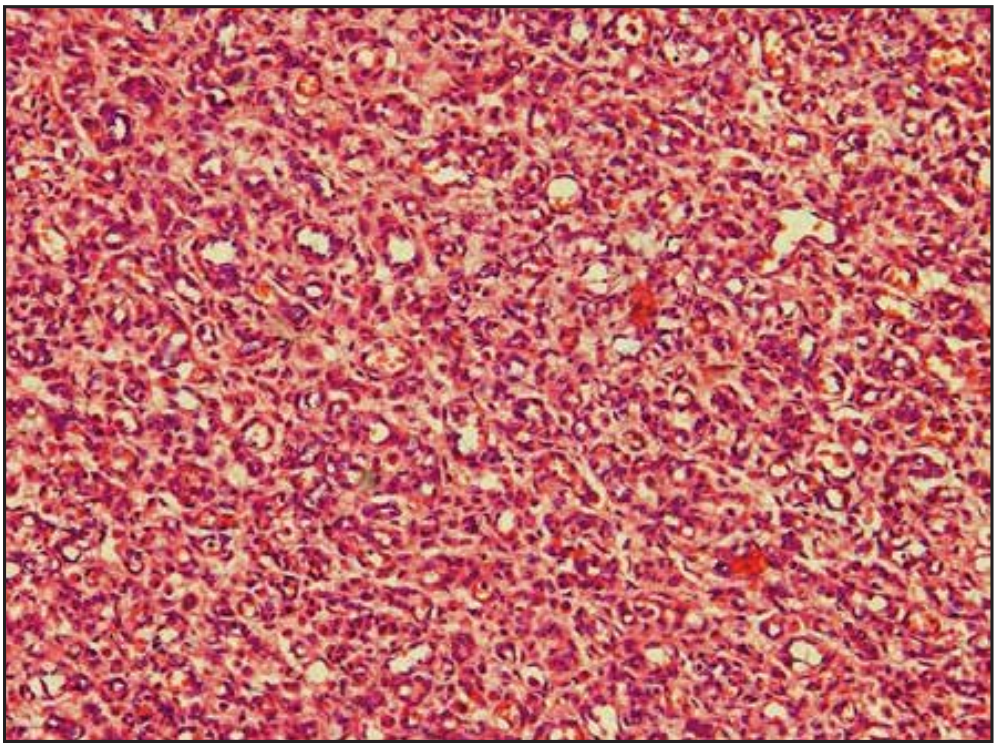

Fig. 51. Chorangioma showing proliferating blood vessels (H & E x 200)

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Annexures

Annexure 1 - Consent form for a feto-infant pathological post-mortem

Name of the baby/mother		Date of admission	
Hospital & ward		BHT	
Name of the referring consultant		Date and time of death / delivery (for IUD)	

1. I …….....(*name of the mother / father)
   …….……(address) consent to a
   - pathological post-mortem of the whole body or
   - limited pathological post-mortem involving following organ/s
     ……..……(name the organs)
     in order to understand the nature and the extent of disease lead to the death and to study the underlying predisposing factors.

2. I understand that
   - small pieces of tissue from each organ examined will need to be processed and examined under a microscope.
   - some organs /tissues may be retained for further examination

3. Declaration:
   - The specialist or the medical officer in charge involved in the management of the deceased, have explained to me the reason for and the nature of the pathological post-mortem and has conveyed the cause of death (in case of a neonatal death).
   - I have read and understood the hospital consent form for feto-infant pathological post-mortem.
   - I am the father / mother of the baby and to the best of my knowledge there is no objection from the spouse for the proposed procedure.
     (Note: The consent should be given by both parents if genetic investigations are done).

4. Select
   - I will accept the body following post-mortem procedure for arrangement of the funeral or
   - I agree for respectful disposal of the body by the hospital.

Optional

I consent / do not consent
- using and keeping samples for research or teaching purposes.
- using the medical records and photographs taken during the examination for research or medical education if the deceased's identity is not revealed.

Signature …… Date .....

Contact telephone number …….

Signature of the Medical Officer:…… Date .....

Designation:……

මළදරු උපතක / ළදරු මරණයක ව්‍යාධිවේද පශ්චාත් මරණ පරීක්ෂණයක් සඳහා කැමැත්ත ප්‍රකාශ කිරීම

මියගිය ළදරුවාගේ හෝ කලළය අයත් මවගේ නම		රෝහලට ඇතුලත්වීමේ දිනය	
රෝහල සහ වාට්ටුව		ඇද ඉහ පත් අංකය	
යොමුකරන වෛද්‍යවරයාගේ නම		මියගිය /ප්‍රසූත කල (මළදරු උපතකදී) දිනය සහ වේලාව	

1. ..... (ලිපිනය) හි පදිංචි..... ..... (මවගේ නම /පියාගේ නම) වන මම මෙම ළදරු මරණයට / මළදරු උපත ට හේතුවූ රෝගී තත්වයේ ස්වභාවය හා ව්‍යාප්තිය ප්‍රත්‍යක්ෂ කර ගැනීම සඳහා කරන
   - සම්පූර්ණ හෝ
   - සීමිත, මෙහි සඳහන් අවයව පමණක් අඩංගු
   ..... (අවයවයන් නම් කරන්න)
   ව්‍යාධිවේද පශ්චාත් මරණ පරීක්ෂණයකට කැමැත්ත පල කරමි.
2.
   - පරීක්ෂා කල සියලුම අවයවවල සාම්පලයන් අන්වීක්ෂීය පරීක්ෂණ සඳහා ගන්නා බවත්,
   - සමහර අවයව/පටක තව දුරටත් පරීක්ෂා කිරීම සඳහා තබා ගන්නා බවත්, මම දැන ගනිමි.

3. ප්‍රකාශය
   - අදාල වෛද්‍යවරු ඇතුළු කණ්ඩායම් විසින් මරණට හේතුව (ළදරු මරණයකදී), ව්‍යාධිවේද පශ්චාත් මරණ පරීක්ෂණයක අවශ්‍යතාවය සහ එය සිදු කරන අන්දම පැහැදිලි කර දුන් බවත්, මා විසින් ව්‍යාදවේදී මරණ පරීක්ෂණයකට කැමැත්ත පල කරන මෙම පත්‍රිකාව කියවා තේරුම් ගත් බවත් මෙයින් ප්‍රකාශ කරමි.

   - මම මෙම දරුවාගේ පියා/මව වන අතර මාගේ දැනුමට අනුව මාගේ බිරිඳගේ / ස්වාමි පුරුෂයාගේ අකමැත්තක් මෙම ව්‍යාධිවේද පශ්චාත් මරණ පරීක්ෂණයට නැති බවත් මෙයින් ප්‍රකාශ කරමි.

     සැ:යු: ජාන නිර්ණය කිරීමේ පරීක්ෂණ සඳහා යොමු කිරීමේදී මවගේ සහ පියාගේ යන දෙදෙනාගේම කැමැත්ත අවශ්‍ය වේ.

4. ව්‍යාධිවේද පශ්චාත් මරණ පරීක්ෂණයෙන් පසු මෙම මළ සිරුරේ අවසන් කටුයුතු සිදු කිරීමට මවිසින් භාර ගන්නා බවත්/ රෝහල වෙත භාර දෙන බවත් මෙයින් සහතික කරමි.

කැමැති නම් පමණක් පිළිතුරු සපයන්න

- අධ්‍යයන පරීක්ෂණ සඳහා හෝ ඉගැන්වීම සඳහා රෝහල හරහා මෙම දේහයේ අවයව/ පටක තබා ගැනීමට මාගේ කැමැත්ත ප්‍රකාශ කරමි.
- මෙම මරණය සම්බන්ධ සියලුම වාර්තා රෝහල මගින් හෝ වෛද්‍යවරුන් මගින් අධ්‍යයන කටයුතු හෝ ඉගැන්වීමේ කටයුතු සඳහා, අනන්‍යතාවය හෙළි නොකර යොදා ගැනීම ට මාගේ කැමැත්ත ප්‍රකාශ කරමි.

මවගේ /පියාගේ අත්සන..... දුරකතනඅංකය.....

අදාල වෛද්‍යවරයාගේ අත්සන. ..... දිනය .....

තනතුර .....

பிறப்பு சார்ந்த நோயியல் பிரேத பரிசோதனைக்கான சம்மத படிவம்

இறந்தவரின் பெயர்		அனுமதிக்கப்பட்ட திகதி	
வைத்தியசாலை வாட்டு எண்		தலைமாட்டு சீட்டு இலக்கம்	
ஆலோசிக்கும் வைத்திய நிபுணர்		இறந்த/ பிரசவித்த திகதியும் நேரமும்	

1..... (பெயர் - தாய்/ தந்தை) ஆகிய .....(விலாசம்) பதிந்துள்ள நான், பின்வருவனவற்றுக்கு சம்மதம் தெரிவிக்கிறேன்.

(அ) முழு நோயியல் பிரேத பரிசோதனை

(ஆ) சில உறுப்புகளுக்கு மட்டுப்படுத்தப்பட்ட பிரேத பரிசோதனை,

.....(உறுப்புகள் பெயர்)

மரணத்திற்கான காரணம் கண்டறியவும், மரணத்திற்கான காரணம் உறுதிப்படுத்தவும், நோயின் தன்மையை அறியவும்.

2.பின்வருவனவற்றையும் அறிந்துகொள்ளுகிறேன்

- ஒவ்வொரு உறுப்பிலும் சிறுதுண்டுகள் நோயியல் பரிசோதனைக்கு கூறு கொள்ளப்படும்.
- சில உறுப்புகள் மேற்கொண்டு நோயியல் பரிசோதனைக்கு தக்கவைத்து கொள்ளப்படும்.

<u>பிரகடனம்</u>

- இறந்தவரின் வைத்தியத்துடன் தொடர்புபட்ட வைத்திய நிபுணர்/ அதிகாரி நோயியல் பிரேத பரிசோதனை பற்றியும் அதற்கான காரணம் பற்றியும் விளக்கி கூறினார். புனித்த சிசு மரணத்திற்கான காரணத்தை வைத்திய அதிகாரி கூறினார்.

- நான்/ நாங்கள் வைத்தியசாலை நோயியல் பிரேத பரிசோதனைக்கான சம்மத படிவத்தை வாசித்து விளங்கிக் கொண்டேன்/ கொண்டோம்.
- நான் குழந்தையின் தாய்/ தந்தை எனவும், எனக்கு தெரிந்த வரை இங்கு கூறிய செயற்பாட்டுக்கு என் வாழ்க்கைத் துணையிடமிருந்து எந்த ஆட்சேபணையும் இல்லை.
- மரபணு தொடர்பான பரிசோதனைக்கு தாய், தந்தை இருவர் சம்மதம் தேவை.

4. தேர்ந்தெடு

☐ நோயியல் பிரேத பரிசோதனை நடைமுறையைத் தொடர்ந்து மரண சடங்கு ஒழுங்குகளுக்காக நான் பிரேதத்தை ஏற்றுக் கொள்வேன்.

☐ நான் வைத்தியசாலையால் கண்ணியமான முறையில் பிரேதத்தை அகற்ற சம்மதம் தெரிவிக்கிறேன்.

விரும்பினால் பூர்த்தி செய்யவும்

நான் சம்மதம்/ ஆட்சேபணை தெரிவிக்கிறேன்

- உறுப்புகள் ஆராய்ச்சி, கற்பித்தல் நோக்கத்துக்கு தக்கவைத்து கொள்ளப்படும்.
- பிரேத பரிசோதனையில் மருத்துவ சம்பந்தமான விபரம், புகைப்படங்கள் ஆராய்ச்சிக்கு, மருத்துவ கற்பித்தல் நோக்கத்துக்கு தக்கவைத்து கொள்ளப்படும் பட்சத்தில் இறந்தவரின் அடையாளம் வெளிப்படுத்தப்படமாட்டாது.

கையொப்பம்_____ திகதி_____

(தாய்/ தந்தை)

கையொப்பம்_____ திகதி_____

(வைத்திய அதிகாரி/ பதவி)

நோயியல் பிரேத பரிசோதனைக்கான வழிகாட்டுதல்கள் - 2015

நோயியல் சார்ந்த வைத்திய நிபுணர்கள் ஆணையம்

Annexure 2 - Request form for a feto-infant pathological post-mortem

Mother's/baby's name				BHT No.	
Age (mother)		Age (baby)		Date of admission	
Referred by				Time and date of delivery	
Hospital and ward				Full/ partial/ external only	
Contact details (mother/father) Tel:				Address:	

Maternal history

Maternal age: ..... Consanguinity:.....

Blood group: .....

Family history of congenital malformations:.....

Relevant medical / surgical history:
.....

Relevant family history:
.....

Long-term drugs:.....

Past obstetric history

Parity	Antenatal complications	Pregnancy outcome	Fetal/neonatal complications (malformations, IUGR, infections etc.)
P1			
P2			
P3			

History of this pregnancy

Duration of pregnancy at delivery: by LMP .....by dating scan .....
EDD (estimated delivery date): .....

Pre-conception folic acid treatment: .....

Antenatal infection screen, including HIV:.....

Anomaly scan (done at.....POA) findings:
.....
.....
.....

Other investigations:
.....

Please tick off the encountered complications of antenatal period

- ☐ Hypertension (pregnancy induced/ Chronic)
- ☐ Diabetes mellitus (gestational / Type 1/ type 2)
- ☐ Bleeding (T1....., T2....., T3.....)
- ☐ Maternal pyrexia (T1....., T2....., T3.....)
- ☐ Pre labour membrane rupture – duration .....
- ☐ Antiphospholipid syndrome and other thrombophilic disorders

Any other (please specify): .....

Events leading up to intrauterine death and/or delivery
.....

Birth history

Mode of delivery: NVD / LSCS / Vacuum extraction / Forceps

Birth weight: .....stillbirth / live birth: .....

Delivery complications : (prolonged labour/ meconium/ birth trauma/ cord prolapse / fetal distress, any other complications (specify)
.....)

In case of a live birth
Apgar score: 1min ..... 5mnt..... 10 mnt .....
Clinical course following delivery

i) Methods of resuscitation
.....
.....

ii) Intensive care
.....
.....

Check list : Please tick off

- ☐ Placenta is sent with the baby / Sent to the laboratory previously.
  If so the date of sending ……..
- ☐ BHT of the mother
- ☐ BHT of the baby (in case of a live birth)
- ☐ Consent form

Annexure 3 - Safety precautions in performing a feto-infant pathological post-mortem

The performance of a post-mortem could involve spilling or splattering of blood or blood-contaminated body fluids, therefore, should be done following universal safety precautions.

These precautions should be followed.

1. Two layers of good quality disposable gloves, disposable plastic apron over a surgical gown, a mask, a cap, boots and protective glasses should be worn when performing a post-mortem.

2. Hands should be kept away from the face and head area.

3. Handling of telephones, doorknobs, documents, cameras and other devices should not be done wearing contaminated gloves.

4. Proper hand washing should be done after the procedure.

5. Work surfaces should be chemically decontaminated with an appropriate disinfectant on completion of work and following any spill of potentially infectious material. All potentially contaminated materials should be collected in biohazard containers and decontaminated, preferably by autoclaving or incineration, before disposal. Therefore, pathological post-mortems should be done in a mortuary with such facilities.

6. Disposal of scalpel blades and needles used should be done according to the sharp disposal protocols.

7. Reusable items should be immersed in an effective chemical disinfectant as a decontamination procedure.

8. Should a needle-stick or accidental inoculation occur, bleeding should be encouraged, followed by immediate, thorough washing and cleansing of the wound. Further details on managing such accidents will be provided by the infection control unit of the institution.

Annexure 4 - Estimation of time since death

Gross features

- Desquamation <1cm : <6hrs
- Cord discoloration: <6hrs
- Desquamation face, back or abdomen: >12hrs
- Desquamation >5% of body: >18hrs
- Desquamation 2 or more of 11 zones: >18hrs (scalp, face, neck, chest, abdomen, back, arms, hand, leg, foot and scrotum)
- Skin color brown or tan: >24hrs
- Moderate to severe desquamation: >24hrs
- Mummification (any): >2 weeks
- Any cranial compression: >36hrs - a poor predictor

Ref: Genest DR, Singer DB. Estimating the time of death in stillborn fetuses: III External fetal examination; a study of 86 stillborns. Obstet Gynecol 1992;80:593-600.

Histological features of fetal tissue

Loss of nuclear basophilia in

- Kidney: tubular nuclei: >4hrs
- Liver: hepatocyte nuclei: >24hrs
- Myocardium: inner half: >24hrs
- Myocardium: outer half: >48hrs
- Bronchus: epithelial cell: >96hrs
- Liver: maximal loss: >96hrs
- GI tract: maximal loss: >1wk
- Adrenal: maximal loss: >1wk
- Trachea: chondrocyte nuclei: >1wk
- Kidney: maximal loss: >4wk

Ref: Genest DR, Williams MA, Greene MF. Estimating the time of death in stillborn fetuses: I. Histologic evaluation of fetal organs; a post-mortem study of 150 stillborns. Obstet Gynecol 1992; 80:575-84.

Histological features of placental tissue

- Villous intravascular karyorrhexis: >6hrs
- Stem vessel luminal abnormalities - total luminal obliteration of a vessel or fibroblast "septation" of the lumen into several small, irregular spaces containing RBC
  - Multifocal (10-25% of stem villi): >48hrs
  - Extensive (>25% of stem villi): >14 days
- Extensive villous fibrosis (>25% 0f villi): >14 days

Ref: Genest DR. Estimating the time of death in stillbirth fetuses: II. Histologic evaluation of placenta; a study of 71 stillborns. Obstet Gynecol 1992;80:585-92.

Annexure 5 - Feto-infant pathological post-mortem reporting format

The report should include the following details

1. Demographic details
2. Date of post-mortem
3. Details of consent and any restrictions
4. Availability of relevant clinical details at the time of post-mortem with a clinical summary
5. Name and the designation of the clinicians requesting and attending the post-mortem
6. Systematic description of external and internal features and results of X- ray and other ancillary investigations
    - External:

– Body weight, head circumference, crown–heel and crown–rump lengths, foot length
– Gestation, degree of maceration (if born dead), meconium staining
– Fontanels, eyes, ears, nose, mouth, palate, digits, palmar creases, umbilicus, state of umbilical cord, genitalia, anus
– Dysmorphic features, congenital malformations and deformities
– Any other external abnormalities

    - Internal:

– Cranial, thoracic, and abdominal cavities and gross and microscopic description of major organs
– Retention and fixation of the brain if practicable and with consent
– Specific reference to ductus arteriosus and umbilical vessels
– Weight of all organs to 0.1 g
– Comment on muscle and skeleton

7. Gross and microscopic description of umbilical cord, membranes and placental parenchyma
– Dimensions, trimmed weight
– Cord length, vessels, and abnormalities
– Membranes, completeness, colour, other abnormalities
– Fetal, maternal and cut surfaces
– Histology and other ancillary investigations as required
8. Summary / Conclusion of major findings including
    a. Sex of the baby
    b. Whether live/ stillborn
    c. Degree of maceration in case of a stillbirth (fresh or minimally/ moderately/ severely macerated
    d. Whether the growth (measurements) and the organ development are appropriate for the period of gestation
    e. Whether dysmorphic features are present or not
    (List all dysmorphic features if any)
    f. Whether congenital malformations are present or not
    (List all congenital malformations if any)
    g. Specify any other pathological findings
    h. Significant placental pathological findings

9. Commentary addressing the clinical questions and significance of pathological findings
10. Mode/ cause of death if possible (with **ICD PM code)
11. Record of the availability of photographs

……

Signature

Name of the Histopathologist

Date……

Annexure 6 - 1 Perinatal Death Documentation Format 2016

Ministry of Health | **P - 1**

Perinatal Death Documentation Format

Hospital and Unit:		**Fetal Death** ☐	**Early Neonatal Death** ☐	
	Summary Sheet			
A	Clinical Record / BHT No:	Mother:	Baby:	
B	Name of Mother / Baby			
C	Ethnicity of mother	☐ *Sinhalese* ☐ *Tamil* ☐ *Muslim* ☐ *Other:*_____		
D	Residential Address			
E	MOH Area	| PHM Area|	District / RDHS|	
F	Age of mother	___ Years	NIC No:	
G	Type of Perinatal Death	☐ *Foetal* ☐ *Early Neonatal Death*	Contact Phone/s|	
H	Gravida		**I.** Parity: ____ | **T**___ **P**___ **A**____ **L**____	
J	Type of Pregnancy	☐ *Singleton* ☐ *Twin* ☐ *Higher*____	**K.** Date of Delivery / Birth: DD / MM / YYYY	
L	Place of Delivery		**M.** Time of Delivery: HH:MM	
N	Type of Delivery	☐ *Normal Vaginal* ☐ *Breech* ☐ *Forceps* ☐ *Vacuum* ☐ *Elective CS* ☐ *Emergency CS* ☐ *Hysterotomy* ☐ *Laparotomy for rupture uterus* ☐ *Other:*_____		
O	POG at birth	_____ *Weeks* _____ *days*	**P.** Method of assessment: ☐ *LMP* ☐ *USS* ☐ *other*	
Q	Birth Weight	_____ *grams*	**R.** Sex : ☐ *Male* ☐ *Female* ☐ *Ambiguous*	
S	Date of death	DD / MM / YYYY	**T.** Age at death (*for ENND*): ___ *days* ___*hrs*	
U	Timing of death	☐ *Antepartum* ☐ *Intrapartum* ☐ *Early neonatal* ☐ *Unable to classify timing*		

Cause/s of Death

		Antepartum	***Intrapartum***	***Early neonatal***
V	ICD-PM Group *The group of main disease or condition that lead to death in fetus or infant*	**A1**_Congenital_malformations_and_chromosomal_abnormalities **A2**_Infection **A3**_Antepartum_hypoxia **A4**_Other_specified_antepartum_disorder **A5**_Disorders_related_to_fetal_growth **A6**_Fetal_death_of_unspecified_cause Unable_to_classify	**I1**_Congenital_malformations_and_chromosomal_abnormalities **I2**_Birth_Trauma **I3**_Acute_intrapartum_event **I4**_Infection **I5**_Other_specified_intrapartum_disorder **I6**_Disorders_related_to_fetal_growth **I7**_Intrpartum_death_of_unspecified_cause Unable_to_classify	**N1**_Congenital_malformations_and_chromosomal_abnormalities **N2**_Disorders_related_to_fetal_growth **N3**_Birth_trauma **N4**_Complications_of_intrapatum_events **N5**_Convulsions_and_disorders_of_cerebral_status **N6**_Infection **N7**_Respiratory_&_cardiovasular_disorders **N8**_Other_neonatal_conditions **N9**_Low_birth_weight_and_prematurity **N10**_Miscellaneous **N11**_Neonatal_death_of_unspecified_cause Unable_to_classify
W	Broad ICD-PM Cause	*The broad cause of death selected from Broad ICD codes. (Please refer to guidelines & codes)*		
X	ICD specific category	Specific cause/s of death		

Maternal conditions contributing to death

Y1	ICD -PM Group (Main maternal disease or condition affecting fetus or infant)	***M1***_*Complications_of_placenta_cord_and_membranes* ***M2***_*Maternal_complications_of_pregnancy* ***M3***_*Other_complications_of_labour_and_delivery* ***M4***_*Maternal_medical_and_surgical_conditions* ***M5***_*No_maternal_condition*
Y2	ICD -PM specific group (Specific maternal condition/s affecting fetus or infant)	

Post-mortem Details

Z	Pathological / Forensic Record No:_____	*Done* ☐ *Not done* ☐ *Details:*
Z_1	Death Registration Information	Certificate of Still Birth (B22) / Declaration of Death (B 33) filled ? ☐ Yes ☐ No **Death Certificate No:**

Notes

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